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Skeptical Inquirer

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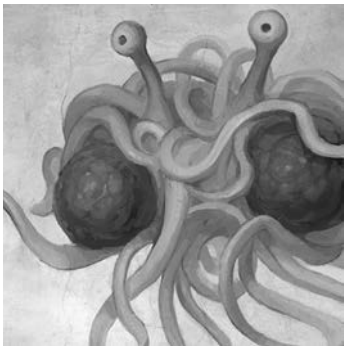
The Follow-Up piece to Reynold Spector's article "Seven Deadly Medical Hypotheses," originally planned for this issue, is available online at www.csicop.org. We hope to publish it in the next issue of the SKEPTICAL INQUIRER.



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[FROM THE EDITOR

Who Really Wants Reliable Scientific Information?

I was on a panel at the recent Northeast Conference on Science and Skepticism in New York City. This was a combined conference of two fine local groups, the New England Skeptical Society and the New York City Skeptics. My panel, moderated by former *Scientific American* Editor in Chief John Rennie, was charged to consider the question, "How can we effectively filter the deluge of information to which we are now exposed via modern communications technology to find the most reputable and reliable sources?"

That is a timely and vital topic, and my fellow panelists dealt with it admirably.

I felt I should play a gadfly role by asking a more fundamental question: "Who assumes most people want 'reputable and reliable sources'?" Perhaps I was in an uncharacteristically pessimistic mood due to so many recent examples in public discourse of exactly what I'm talking about. I'm usually an optimist, a glass-half-full kind of person. But lately we've all seen that in regard to acceptance of scientific findings that are in any way unwelcome or uncomfortable, the glassware is at least half empty—and it's cracked and leaking. Many examples have been reported in our pages in recent issues (on topics such as evolution, climate change, the 9/11 attacks, and much else); others occur daily, especially in the public arena.

The question I posed *is* the more basic problem, isn't it? Oh, when it comes to strictly factual matters of no emotional import (What time does my plane get in? What is the world's population? What is Lady Gaga's real name?), we seek out the best, most reliable sources. They are readily available on the web, in print, and elsewhere.

But when it comes to matters that we have a personal stake in, things that affect our core values and beliefs, we really don't necessarily want "reputable and reliable" sources. What we *really* want is information that supports our beliefs. And that's what we seek. Few people will admit to that—we are very human after all—but psychologists know these processes well. Our minds are laser beacons for narrowly seeking out and finding what information supports our already formed belief systems—and they resist, ignore, belittle, negate, denigrate, or deny altogether all contrary information we find. It's called "confirmation bias," among other things. We are masters of this process. We seek out every little snippet of information, rumor, or report that fits our preconceived notions, and we cast aside all else. This is the opposite of scientific thinking, of course. But scientific thinking is hard, very hard. It's a bit unnatural.

So this, to me, is the more basic problem.

As for information overload, it has always been there. Who could ever read all the books in a library (Alexandria's more than two millennia ago or the Library of Congress today) or all the magazines printed or all the scholarly journal articles published even in one's own field? (Or all the sports stories or gossip tidbits, for that matter.) The availability of so much more information now electronically—theoretically everything that is "knowable"—just compounds the magnitude of the problem while compensating for it somewhat by increasing the speed at which we can search for and find the information we want, be it reputable and reliable *or* comforting and supportive.

Years ago in the pages of the SKEPTICAL INQUIRER Isaac Asimov wrote, "Inspect every piece of pseudoscience and you will find a security blanket, a thumb to suck, a skirt to hold. What have we to offer in exchange? Uncertainty!

(Continued on page 9)

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Comet Elenin Will Not Destroy Earth This Year

David Morrison

In the middle of the gathering Internet fear about the doomsday of December 12, 2012, there have been two new apocalyptic distractions. First there was a widely reported prediction by fundamentalist preacher Harold Camping (the founder of "family radio" in California) that the end of the world would begin on May 21, 2011. Camping claimed that on this date the good people would be transported to heaven in what is called "the Rapture." It now seems clear that this did not happen or that the number of good people is vanishingly small.

In addition, there is growing fear of newly discovered Comet Elenin, which is variously predicted to collide with Earth in October 2011 or to induce massive earthquakes and pole shifts from its gravitational or magnetic perturbation of our planet. Some even claim that Elenin is not a comet at all but a massive brown dwarf star.

What are the facts? C2010 X1 Elenin (to give its full name) is a long-period comet that takes about 10,000 years to complete one orbit around the Sun. Russian amateur astronomer Leonid Elenin discovered it with a robotic telescope in New Mexico on December 10, 2010. It reaches perihelion (when it will be closest to the Sun) on September 10, 2011, and will be closest to Earth on October 16 at a distance of thirty-five million kilometers, approximately one hundred times farther than the distance between Earth and the Moon. The comet is a tiny object, roughly five kilometers in diameter, and (like all comets) it is visible only because it outgases an extensive, tenuous atmosphere as it is warmed by the Sun. Its mass is less than one-billionth the mass of Earth. Although several amateur astronomers are regularly photographing the comet, it has remained faint through June 2011, and it may never become visible to the naked eye.

One of the frequent claims on conspiracy theory websites is that this comet shifted Earth's axis by three degrees in February 2010, precipitating the Chile earthquake. Some believe that it also caused a larger pole shift that triggered the Japan earthquakes of March 2011. Ignoring plate tectonics as the cause of earthquakes, they suggest that the comet exerted strong gravitational or electromagnetic effects on our planet. When scientists pointed out that this little comet can have no measurable gravitational or tidal effect, and that comets do not have magnetic fields, the story shifted. For people who are convinced the comet did cause the earthquakes, this proves that Elenin is not a comet at all but a much more massive (and dangerous) interloper.

Weissman, Hicks, and Somers/JPL Table Mountain Observatory

Comet Elenin on May 5, 2011, when it was 170 million miles from Earth. It is nothing unusual and no dramatic events are expected.

The fact is that Elenin fits the definition of a comet: It is a solar system object with an elongated (eccentric) orbit that is outgassing a tenuous atmosphere (coma) and tail as it approaches the Sun. Comets are defined operationally by the presence of the visible coma and tail. It is clear that Elenin cannot possibly be a massive object like a brown dwarf. If it were, it would not have a coma or tail because the gas cannot escape from an object with substantial gravity. In addition, if it were massive we would be seeing its gravitational influence on the orbits of the planets, especially Mars and Earth, but there is no change in these orbits. Finally, if it were a brown dwarf it would have been easily detected in the various previous astronomical surveys, including the recent WISE infrared mission, even when it was still in the outer solar system.

Ironically, the inconspicuous nature of this comet plays into some of the conspiracy theories. There are many claims that NASA and the news media are suppressing information about Elenin. When NASA sent a video on disaster preparedness to its employees in June, I began to hear claims that this was to prepare us for Elenin. Some websites have substituted photos of the much brighter comet Wild 2 and called it Elenin. In an unusual step, NASA/JPL released a comment by Don Yeomans, NASA's top comet scientist, who described Elenin as "kind of wimpy." He noted that we will "probably need a good pair of binoculars, clear skies, and a dark, secluded location to see it even on its brightest night."

Other websites suggest that the comet is accompanied by a giant UFO that controls its orbit. They assert that aliens are steering the comet into collision with Earth. These claims sound like the rumors that surrounded Comet Hale-Bopp in 1997. It, too, was said to be accompanied by a UFO, and many people bought telescopes so that they could watch it. As we all remember, the Heaven's Gate cult interpreted the arrival of Hale-Bopp as a signal for their mass suicide, thinking they would be transported to the accompanying spaceship. While there is nothing to fear from Comet Elenin, perhaps we should be afraid of how some people are reacting to it.

Related Articles

David Morrison's "The Myth of Nibiru and the End of the World in 2012" (SI, September/October 2008), "Update on the Nibiru 2012 'Doomsday'" (SI, November/December 2009), and "The 2012 Doomsday Hoax: Update II" (SI, July/August 2011). See also Robert Sheaffer's "2012: Peter Gersten's 'Leap of Faith'" (SI, July/August 2011) and the third part of his column in this issue, p. 33.

David Morrison is a planetary scientist, a NASA senior scientist, and a Committee for Skeptical Inquiry fellow.

Power Balance, Down and Out in Australia

Richard Saunders

Photo : Rachael Dunlop

Richard Saunders with Power Balance wrist bands, which he demonstrated don't work.

We have all heard the expression "two steps forward, one step back." This is all too often the story with skeptical activism, and it can even be a case of "two steps forward, one step to the side, three steps back" and so on. In a strange sort of skeptical two-step, dedicated campaigners can find themselves right back at the start after waltzing around for months if not years. But there are exceptions.

Over the past year, thanks in large part to skeptical activism, the Power Balance franchise in Australia has collapsed. For those who don't know, Power Balance is a thin rubber wrist band with two embedded holographic disks. In Australia the band cost $64 AUD (~$68 USD). It was, and still is, claimed that the holograms contain "frequencies" that can improve the balance, strength, and flexibility of the wearer. Many sporting stars continue to this day to promote the band. (See Harriet Hall, "Power Balance Technology: Pseudoscientific Silliness Suckers Card-Carrying Surfers," SI, May/June 2010.)

In late 2009 I was asked to appear on the Australian television news show *Today Tonight* to examine the claims of the Power Balance company by putting none other than Tom O'Dowd, the Australian distributor of the product, through a series of tests. At first, when O'Dowd demonstrated the effect of the hologram by pushing down on the outstretched arms of six volunteers, the volunteers found that they had considerably more strength to resist once they had the hologram on them or near them. O'Dowd reported that he was very happy with the volunteers and all was working as he predicted. I had the impression that O'Dowd sincerely believed in the product.

Then I produced one of the most valuable and powerful tools in the skeptical arsenal: the humble six-sided die. Out of sight of O'Dowd (and me) the roll of the die decided which one of the volunteers would have the hologram slipped into his or her back pocket. As the national television audience saw, O'Dowd (and thus Power Balance) failed five out of five times to identify the correct volunteer during his strength tests (see http://tinyurl.com/3yak3vo).

Inspired by this adventure and with help from skeptical friends, in early 2010 I produced a ten-minute video for YouTube titled "Applied Kinesiology: How It's Done" (http://tinyurl.com/2v35zs3). This video shows the three primary tricks used by Power Balance (and its clones) to give the illusion of more power. (It is important to note that even the person demonstrating the Power Balance can fall victim to the ideomotor effect and thus not realize that he or she in fact controls the perceived power of the subject.) The video has had more than one hundred thousand views, and judging by the e-mails I have received, it has stopped many people from falling for the scam.

Then I visited the office of *CHOICE* magazine, an independent consumer watchdog, and suggested they consider doing a report on Power Balance. I explained the tricks used and advised on testing. They, true to their guidelines, tested the product without further involvement by me or the Power Balance company. Their conclusion was that the product did not perform as claimed. They awarded the Power Balance band their Shonky Award, given for the worst scams and rip-offs, in 2010. This event was covered by the media and sent out a strong message to the Australian public (see http://tinyurl.com/5rv987a).

With all the negative publicity and complaints, the government had to act. In December 2010 the Australian Competition and Consumer Commission (ACCC) ordered Power Balance Australia to refund all customers who felt they had been ripped off. ACCC chairman Graeme Samuel said in a statement: "Power Balance has admitted that there is no credible scientific basis for the claims and therefore no reasonable grounds for making representations about the benefits of the product."

Sales dried up, and in May 2011 Power Balance in Australia collapsed (see http://tinyurl.com/3o7blh3).

I am delighted to have played a small part in ending this scam that raked in millions of dollars in Australia alone. I thank reporter Frank Pangallo from *Today Tonight* for asking me to take part in the television report that started the ball rolling.

Richard Saunders is a CSI fellow, Life Member of Australian Skeptics, and producer of the *Skeptic Zone* podcast.

Loftus, Stollznow Join CSI Executive Council

The Committee for Skeptical Inquiry (CSI) has elected two new executive council members, Elizabeth Loftus and Karen Stollznow. As members, they will also serve on the SKEPTICAL INQUIRER editorial board.

Elizabeth Loftus is a world-renowned psychologist with an expertise in human memory. She has conducted extensive research on the misinformation effect and the nature of false memories. In 2002 she was ranked number 58 (the highest-ranked woman) on a list of the 100 most influential researchers in psychology in the twentieth century.

At the University of California, Irvine, Loftus is a distinguished professor in the Department of Psychology and Social Behavior; the Department of Criminology, Law, and Society; and the Department of Cognitive Sciences, and she is also a fellow of the Center for the Neurobiology of Learning and Memory and a professor of law.

Karen Stollznow has spent more than a decade investigating pseudoscientific and paranormal beliefs and practices, including ghosts, aura reading, psychics, medical intuitives, alternative therapies, mediums, faith healing, conspiracy theories, cults, pareidolia (seeing faces on places other than heads), religion, haunted houses, and more.

Stollznow is a researcher at the University of California, Berkeley, and received her PhD in linguistics from the University of New England. A prolific writer about skepticism, she is the "Naked Skeptic" columnist for CSI and the "Bad Language" columnist for *Skeptic* magazine. In addition, she is a host of the *Point of Inquiry* podcast and a cohost of the *Monster Talk* podcast. She is a SKEPTICAL INQUIRER contributing editor and managing editor of the Center for Inquiry's peer-reviewed journal the *Scientific Review of Mental Health Practice*. She is also a research fellow of the James Randi Educational Foundation and a former director of the San Francisco Bay Area Skeptics.

"We are pleased to have both of these distinguished scholars fighting for science and reason in the trenches as part of their daily lives and professions on the executive council," says Barry Karr, executive director of CSI and a CSI fellow. "With Karen's humorous and stimulating contributions to skepticism and Elizabeth's achievements in academia, they are welcome additions."

"We are pleased to have both of these distinguished scholars fighting for science and reason in the trenches as part of their daily lives and professions on the executive council."
— Barry Karr,
CSI executive director

Elizabeth Loftus

Karen Stollznow

Play It Again, Sylvia: Failed Predictions on bin Laden, Aliens

Bryan Farha

The failed predictions of Sylvia Browne have long been chronicled by several skeptics, including this writer. Aside from the benign daily failed predictions of relative unimportance, lately Browne has missed the mark on "the big ones." For example, we know about the 2004 cruelty of Browne telling the parents of then-missing child Shawn Hornbeck that their son was dead—only to have him found alive in 2007 (see "Sylvia Browne's Biggest Blunder," SI, May/June 2007). Now we can add the failure of her missed predictions about Osama bin Laden and alien visitation.

On December 28, 2005, I was a guest on CNN's *Larry King Live* along with a few alleged psychics, including Sylvia Browne. Regarding the subject of Osama bin Laden, Browne and I had this brief exchange (from the CNN transcript):

> FARHA: Well, first of all, let's put this in perspective here. Last year on *The Montel Williams Show*, Sylvia predicted that Osama bin Laden is dead. I don't know if Sylvia still thinks that or not but I'd sure like to know.
>
> BROWNE: Yes, I do.
>
> FARHA: My whole take on this is—Okay, very good, well, we'll find out sometime, Sylvia. We'll find out.

Well, Sylvia, we found out. Bin Laden was clearly alive in 2005 and lived until May 1, 2011. Another "big" prediction of Browne's failed.

Then, in 2006, again on *The Montel Williams Show*, Sylvia made this prediction: "Aliens will begin to show themselves in the year 2010, they will not harm us, they simply want to see what we are doing to this planet. They will teach us how to use antigravity devices again, such as they did for the pyramids" (from www.sylviabrowne.com).

Now that we are in 2011, we know this was yet another "big" prediction that failed. In light of repeated failed predictions, do you think Browne's followers will abandon her? We know the answer to that. Play it again, Sylvia.

Bryan Farha is professor of behavioral studies in education at Oklahoma City University. He is a CSI scientific and technical consultant and is editor of *Paranormal Claims: A Critical Analysis*.

Casten Elected a Fellow of CSI

The newest fellow of the Committee for Skeptical Inquiry is nationally known energy expert and entrepreneur Thomas R. Casten.

Casten has devoted more than three decades to developing decentralized energy recycling projects. He is founder and chairman of Recycled Energy Development, a Westmont, Illinois, company that captures energy that is normally wasted and turns it into electricity and heat. He had earlier founded two other energy cogeneration and recycling companies. Casten is author of the book *Turning Off the Heat* (Prometheus Books, 1998) and numerous journal and magazine articles. He was lead author of the 2009 *American Scientist* cover article "Getting the Most from Energy." He has won many national awards and has been profiled in science journals and national magazines. He also serves on the boards of several energy organizations, the Climate Institute, and the Oregon Climate Trust.

Casten has long been an outspoken advocate of increasing energy efficiencies by reducing energy waste in the production of electricity, both to save energy and to reduce global greenhouse gases that cause global warming. Reducing emissions this way, he argues, can be not only highly beneficial but also economical (see his SI cover article "Critical Thinking About Energy," January/February 2005).

He is a longtime supporter of the skeptical movement, having served for many years on the executive council and the board of directors of the Committee for Skeptical Inquiry and on the board of the Center for Inquiry. His concerns include the need for critical thinking and greater scientific literacy on scientific and technological issues essential to the world's future.

Holly Bobo Still Missing; Psychics Hurt Investigation

Benjamin Radford

Holly Bobo, a young nursing student from Decatur, Tennessee, was abducted April 13, 2011; she was last seen being led into the woods near her home by an individual wearing camouflage. Despite national media coverage, extensive police searches and investigation, and an $80,000 reward, neither Bobo nor her abductor have been found. Police are no longer actively searching for her and have no suspects, though the investigation remains open and ongoing.

The Bobo case was plagued by misinformation from the start; early reports falsely suggested that Bobo's brother Clint was a suspect in her disappearance. Police have complained that well-meaning individuals have been disseminating misinformation and false leads about the case, making their job much more difficult and doing far more harm than good.

One psychic said she believed that the lyrics of the Neil Diamond song "September Morning" contained important clues to finding Bobo.

Dozens of self-proclaimed psychics have offered hundreds of incorrect, vague, and often contradictory tips. Here's just a sample of information and leads offered by psychics on this case: Bobo's abductor might have a scar on his forehead, a rash on his elbow, or a bite mark on his hand. He might work from home as a graphic designer and long for the 1950s. His hair might be dark brown, blond, or salt-and-pepper. He might be clean shaven, or he might have a moustache. He might be a Scorpio. He is either scrawny, of medium build, or stocky and muscular—possibly ex-military. He might own a black leather wallet, and his name might contain one or more of the following letters: *B*, *A*, *J*, *R*, *W*, or *M*; his last name might be Glenn. Bobo might be (or might have been at one point) in or near a place that has the number seven associated with it, indicating an address, a highway number, or possibly the distance from some landmark. One psychic said she believed that the lyrics of the Neil Diamond song "September Morning" contained important clues to finding Bobo.

It's not clear how police are supposed to use this jumble of random associations, images, numbers, letters, and feelings provided by psychics. This information is so vague, general, and contradictory that it is completely useless. The case even attracted the attention of TV psychic Carla Baron, who said that a friend of the Bobo family had contacted her on their behalf. Baron was part of the TruTV show *Haunting Evidence*, in which she and two other investigators tackled real-life unsolved murders. The show was cancelled after twenty-two episodes without any of the cases having been solved; two were later closed through police work (see Radford, "New Psychic Detective (Un)-Reality Series: *Haunting Evidence*," SI, September/October 2006). Baron has said that the Bobo family later chose not to seek her information on Holly's death on the advice of the police, who Baron believes were "terrified to hear what I might have to say" about the abduction. The fact that psychic detectives have a zero percent track record of success locating missing persons might also have something to do with it. (For more on Baron, see "Carla Baron, Psychic Detective? Not Quite," Skeptical Inquirer, September /October 2006.)

—Benjamin Radford

[FROM THE EDITOR

(Continued from page 4)

Insecurity!" ("The Perennial Fringe," Spring 1986; reprinted in the SI anthology *The Hundredth Monkey* [Prometheus Books, 1991]).

Fact-oriented, evidence-seeking, science-loving people like us—who are very comfortable in the uncertainty and insecurity of fact-based reliable and reputable information even if it doesn't provide us a thumb to suck or a skirt to hold—are in the minority. (And none of us is perfect in this regard either.) Most people, and again few will admit it, really want that comforting stuff: Yes, there must be life after death. Yes, we can get well from simple off-the-shelf remedies, untested or not, without resorting to complicated modern medicine. Sure, we can continue pumping 30.6 billion metric tons of carbon dioxide greenhouse gas into the atmosphere per year (the recently announced record figure for 2010) without changing it. No, we're not really part of the animal kingdom descended from any of those ugly, old, apelike creatures, and, no, we don't have any DNA in common with slime mold. We're more special than that. Yes, yes, we must really be in some way the center of the universe. There has to be some great, essential cosmic meaning! It's all about us, isn't it?

We crave information that reinforces our beliefs. All other information takes a back seat or even gets tossed in the trunk. Research about the brain has produced a litany of new studies showing why that is so.

So, unless we find a way to overcome our very human tendencies to seek out and find information that supports our deep-seated beliefs while disregarding all information to the contrary, the question of how to filter through the exa- and zettabytes of "information" out there to find reliable facts is more of a secondary information-processing problem. The primary problem is that one core, incontestably human fact about ourselves.

Kendrick Frazier

"It is error only, and not truth, that shrinks from inquiry."
– Thomas Paine

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An Ambitious, Hopeful Response to 9/11

CHARLES M. WYNN SR.

On the morning of September 11, 2001, I was watching a videotape of an episode from the *Ascent of Man* television series created by Jacob Bronowski. It was titled "Knowledge or Certainty." Bronowski was discussing the rise of Hitler in Germany and other tyrants elsewhere. I listened to him discuss the confrontation between the ascent of man and these despots' belief that they had absolute certainty.

In the final scene, Bronowski stands at the edge of a pond at Auschwitz, a pond that contains the ashes of his family, and says:

> There are two parts of the human dilemma. One is the belief that the end justifies the means. That push-button philosophy, that deliberate deafness to suffering, has become the monster in the war machine. The other is the betrayal of the human spirit: the assertion of dogma that closes the mind, and turns a nation, a civilization, into a regiment of ghosts—obedient ghosts, or tortured ghosts. . . . When people believe that they have absolute knowledge, with no test in reality, this is how they behave. This is what men do when they aspire to the knowledge of gods.

When I removed the tape from my VCR, I became aware of the image of a smoldering World Trade Center on my television screen. Listening to the commentary that accompanied this image, I was shocked. I was stunned. I was confused. And I desperately needed some answers. I asked myself, "What could inspire one group of human beings to engage in the mass destruction of other groups of human beings?"

Eventually I realized that what inspired these people to use airplanes as weapons of mass destruction was absolute certainty in a malignant version of a religious belief—an actively evil interventionist version of that belief, a version that contrasts markedly with the benign noninterventionist religious beliefs of the billions of people who seek to lead moral lives in which they do not try to impose their beliefs on others.

The perpetrators of this act believed their actions were justified by their interpretation of the Qur'an (the Muslim holy book or scripture), an interpretation in which every word in that book is taken to be the literal truth. They believed with certainty that their version of religion is the only acceptable one. They believed, as Jacob Bronowski said, "that they [had] absolute knowledge, with no test in reality." It occurred to me that as long as people persist in believing that every word in their holy scripture is the literal truth, they will continue to deny the realities of this world.

I decided that one of the most direct ways to challenge the assertion that every statement in religious scripture is the literal truth is to examine scriptural statements about the genesis and development of life forms. According to the Book of Genesis and the Qur'an, God created the universe and Earth in six days. By summing up the generations listed in the Hebrew Bible, the age of the universe and Earth as well as the duration of humans would be no more than 10,000 years. In contrast, according to science's fourteen-billion-

CHARLES M. WYNN SR. is professor of chemistry at Eastern Connecticut State University. He is coauthor of a science trilogy: *The Five Biggest Ideas in Science*, *Quantum Leaps in the Wrong Direction: Where Real Science Ends and Pseudoscience Begins*, and *The Five Biggest Unsolved Problems in Science*. He is also recipient of the In the Trenches Award from the Committee for Skeptical Inquiry.

year scenario known as evolution, *Homo sapiens*, or modern humans, appeared no less than 100,000 years ago.

If we could convince people that scriptural statements about how life began are not literal truths, that they stand in stark contrast to the findings of modern science, one hopes those people would be empowered to examine other biblical and Qur'anic statements and question those religious teachers (be they imams, rabbis, ministers, or priests) who claim that every word in scripture is inerrant. Most important, they would also be empowered to refute religious zealots who quote the Qur'an or Bible to justify acts of violence.

Toward that end, I asked three scientists, each of whom is convinced of the validity of evolution and is also an active participant in a different Abrahamic religion, to carefully explain the evidence for evolution and then explain how they have reconciled that theory with the scriptures of their faiths. All Things That Matter Press has just published their responses in a book titled *And God Said, "Let There Be Evolution!": Reconciling the Book of Genesis, the Qur'an, and the Theory of Evolution*.[1]

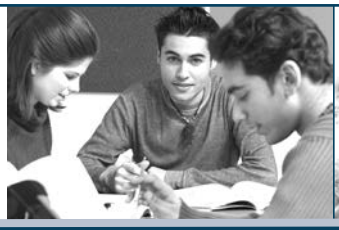
I was not surprised that the responses revealed similarities in these three scientists' beliefs about science and religion. Also, not surprisingly, the responses of a Jew, a Christian, and a Muslim revealed dissimilarities resulting from different religious perspectives. It is in our collective best interest to focus on the similarities rather than dwell upon the differences.

It would be naive to believe that a book such as this will dramatically alter the mindsets of people who carry out horrific acts such as the September 11, 2001, attacks. Nevertheless, as Rabbi Tarfon admonished in *Ethics of the Fathers*: "It is not incumbent upon you to complete the work, yet neither are you free to desist from it." ■

Note

1. The three scientists who contributed to *And God Said, 'Let There Be Evolution!': Reconciling the Book of Genesis, the Qur'an, and the Theory of Evolution* (Charles M. Wynn Sr. and Arthur W. Wiggins, eds. All Things That Matter Press, 2011) are Rabbi David Kay, Howard Van Till, and T.O. Shanavas.

SCIENCE AND THE PUBLIC



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When the Shrinks Ignore Science, Sue Them

JAMES D. HERBERT and RICHARD REDDING

In 1793, there was an outbreak of yellow fever in Philadelphia. Benjamin Rush, a leading colonial physician and signer of the Declaration of Independence, accepted the conventional wisdom that the condition should be treated with bloodletting. This treatment contributed to the demise of many of his patients. Nevertheless, as the epidemic waned, Rush was more convinced than ever of the efficacy of his methods. When Rush's patients recovered, he attributed their recovery to his intervention. When they died, he chalked it up to the inevitable course of the disease.

James D. Herbert, PhD, is professor of psychology and associate dean of the College of Arts and Sciences at Drexel University in Philadelphia.

Richard E. Redding, JD and PhD, is professor and associate dean at Chapman University School of Law and professor of psychology at Chapman University.

Medical practice has come a long way since Rush. Antibiotics and vaccines, to name two obvious examples, have been transformative. Without exception, these advances have been driven by the application of science to health care. Science substitutes controlled scientific data and statistical predictions for the practitioner's intuition and clinical lore, which are prone to biases in decision making, as Rush illustrated.

By promulgating practice guidelines, institutions like the United Kingdom's National Institute for Clinical Effectiveness and the United States' Comparative Effective Institute work to codify medical practice based on the best available scientific evidence. But not everyone is sanguine about dethroning practitioners' judgment in favor of science, and spirited defenses of clinician autonomy have emerged in both the professional literature (Hagemoser 2009) and the popular press (Greenfield 2010).

But consider recent cases involving mental health care. A father lost custody of his child because the mental health evaluation of the parent relied upon the scientifically unfounded Rorschach "inkblot" test. A depressed patient experienced severe side effects from antidepressant medications but was never informed about the option of equally effective treatments like cognitive-behavior therapy. And a number of therapists promise that repeatedly tapping (yes, tapping!) on their patients will cure serious disorders and addictions by adjusting the body's invisible "energy field" (Gaudiano and Herbert 2000).

One of our own patients suffered from severe obsessive compulsive disorder. He would spend hours each day showering and washing his hands until they bled. He sought treatment from a psychoanalyst, who insisted that his symptoms reflected unconscious drives that he must "work through." After his symptoms gradually worsened over

several years of this analysis, he eventually sought behavior therapy and within weeks was completely cured of his condition.

Although many psychological interventions may be ineffective but otherwise benign, research has demonstrated that others can be quite harmful (Lilienfeld 2007). Crisis debriefing is promoted to decrease post-traumatic stress reactions following a trauma, but in fact it actually increases the risk of such problems (McNally et al. 2003). So-called "attachment therapies" have led to the death of several children (Mercer et al. 2003). Facilitated communication, a technique promoted as allowing otherwise severely impaired individuals with autism to communicate fluently via typing on a keyboard while a facilitator supports his or her hand or arm, has led to parents being falsely accused of sexual abuse (Herbert et al. 2002; Romanczyk et al. 2003). These are only a few potentially harmful interventions. Despite data illustrating their potentially harmful effects, they remain surprisingly popular and continue to be used.

Such practices represent the tip of the iceberg of a persistent problem in mental health care: the chasm between science and practice. To close that gap, several steps must be taken. Of course we need malpractice reform, but not as it is usually conceived. The pernicious effects of frivolous malpractice suits in encouraging unnecessary diagnostic and intervention procedures are widely discussed. But when mental health practitioners use methods that are totally lacking in scientific support, particularly when the treatment has been demonstrated to be harmful and evidence-based alternatives are available, they should be liable for malpractice.

Yet unlike lawsuits against other medical professionals, lawsuits against psychiatrists and psychologists have been exceptionally rare—and successful suits even rarer. Mental health practitioners have been able to escape liability by relying on prevailing community practices—no matter how misguided—to define the permissible standard(s) of care. A defendant can always round up some likeminded community practitioners who will testify that the procedure in question is widely practiced, even if it is scientifically unfounded.

Although suits against mental health professionals remain uncommon, litigants can and should make use of a Supreme Court case to make their claims viable. In *Daubert v. Merrell Dow Pharmaceuticals* (1993), the Court ruled that expert testimony must be based upon reliable "scientific knowledge" rather than common practice. Thus, when a mental health professional is sued for treating a patient with harmful or unscientific techniques, expert witnesses called upon to describe the prevailing standard of care must base their testimony on science. No longer can defendants argue that they met the standard of care merely because they employed techniques often used by others in the profession.

When mental health practitioners use methods that are totally lacking in scientific support, particularly when the treatment has been demonstrated to be harmful and evidence-based alternatives are available, they should be liable for malpractice.

We acknowledge that clinical practice is complex and often does not lend itself to a simple application of scientifically established treatment protocols. For example, patients do not always fit neatly into diagnostic categories; this requires clinicians to use interventions established for closely related conditions. Patients do not always respond to first-line evidence-based interventions, therefore modifications of an established treatment or even a different approach may be necessary. Evidence-based treatments may not yet be established for some disorders or symptoms, so modifications of established treatment strategies or even a novel or experimental approach may be required. Moreover, in the case of psychotherapy, even relatively straightforward cases necessarily involve some degree of tailoring of the treatment to each individual's unique circumstances. Each of these scenarios requires judicious clinical judgment. But such judgment should always be informed by the best available scientific evidence. Clinical judgment does not represent a *carte blanche* to escape scrutiny or legal liability.

A related issue is informed consent. Despite being ethically mandated, mental health practitioners rarely obtain fully informed consent from their patients for their interventions. An interesting issue centers on the question of whether clinicians should be permitted to offer services that are completely devoid of scientific support as long as the

patient is fully informed of this fact, is informed of any known risks associated with the treatment, is informed of alternative options, and is paying out-of-pocket rather than through a private or governmental insurer. Without resolving this particular issue, it is clear that clinicians should always obtain fully informed consent, and such consent becomes even more important the further one deviates from scientifically established practices.

It will take time for case law to sort through the nuances of these real-world complexities. In the meantime, clinicians can minimize their risk of malpractice liability by using scientifically supported procedures whenever possible, ensuring that modifications to established treatments are scientifically informed, avoiding interventions that have been shown to be harmful while providing little or no benefit, and obtaining fully informed consent, especially for experimental procedures. In contrast, by seeking relief through the courts, not only can consumers who have been harmed by unscientific mental health practices seek appropriate damages, but they can also exert a positive influence on the field as a whole by encouraging scientifically based practice.

In addition to malpractice suits, other changes are needed to place routine clinical practice on stronger scientific footing. We need an unequivocal commitment to scientific practice by professional organizations, third-party payers, and state licensure boards. Organizations such as the American Psychological Association pay lip service to scientific standards, but they leave gaping loopholes that allow psychologists to practice all kinds of pseudoscientific nonsense. All too often psychiatrists, psychologists, and other mental health clinicians use unproven and even demonstrably harmful assessment and treatment procedures, even when alternative scientifically supported methods are available. A key principle inherent in health-care reform is that in order to save costs and improve outcomes, medical practice should be driven by the best scientific evidence (The Hastings Center 2009). That principle should also be applied to mental health professionals, particularly because research has found a number of psychological and psychiatric interventions to be effective (sometimes more so than treatments for physical disorders).

Organizations such as the American Psychological Association pay lip service to scientific standards, but they leave gaping loopholes that allow psychologists to practice all kinds of pseudoscientific nonsense.

Next, we need user-friendly practice guidelines that are based on the best available scientific evidence and are free of undue influence from interest groups. Reflecting the influence of the pharmaceutical industry, the American Psychiatric Association's guidelines for the treatment of depression are heavily skewed toward drug therapies despite many scientific studies showing that certain forms of "talk therapy," such as cognitive behavior therapy, yield longer-lasting effects with fewer complications. (Of course, the best guidelines are not overly rigid but allow the practitioner to tailor them to an individual patient's unique clinical picture.)

Finally, we must improve consumer education. Paradoxically, the growth of the Internet and advertising of pharmaceuticals makes information more available to consumers but also makes it more difficult to filter good science from potentially harmful pseudoscience.

Each of these strategies has an important role to play, but malpractice suits against mental health professionals may become *the* critical motivating force behind change, so that the shrinks, too, are guided by science rather than their modern-day versions of bloodletting. ■

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Engineering Truth

'9/11 Truth' activists and luminaries gathered for a conference in Atlanta, allowing a glimpse into their alternative political subculture.

ROBERT BLASKIEWICZ

It's the supposed day of the Rapture, May 21, 2011, but I'm in a taxi heading to the First Iconium Baptist Church in Atlanta, Georgia, for other reasons. My driver tells me about how he passes his late nights on the road by listening to George Noory on *Coast to Coast AM*. "I don't know about most of the theories out there about the World Trade Center," he assures me, "but I do have to wonder about that Building 7."

Robert Blaskiewicz is a Marion L. Brittain postdoctoral fellow at the Georgia Institute of Technology, where he teaches courses in writing and twentieth-century American literature. He specializes in World War II veterans' writings, extraordinary/paranormal claims, and conspiracy theory. He coedits the blog *Skeptical Humanities*. E-mail: rjblaskiewicz@gmail.com.

In fact, I'm on my way to interview a man who, perhaps as much as any other person, has drawn public attention to what he sees as inconsistencies in the "official" story of September 11 and has made a mission of keeping World Trade Center 7 (WTC 7), which collapsed late in the day of the attacks, in the public eye. He is architect Richard Gage, founder of the organization Architects and Engineers for 9/11 Truth. He is attending the event "Engineering Change: A Blueprint for 9/11 Truth" at the behest of the local chapter of his organization and We Are Change Atlanta.

When I meet Gage, he is enthusiastic, genial, and eager to start the interview as soon as he finishes setting up. We take a seat in one of the pews. Camron Wiltshire, the local organizer of the event, has asked to film my interview and has sent over someone with a smart phone to record it. (He later tells me that this is so I will not take anything out of context in my article.)

Gage's conversion to 9/11 Trutherism is a sort of "Road to Damascus" story. About five years ago, he heard retired theologian and prolific 9/11 Truther David Ray Griffin on his car radio. Griffin was giving a talk in nearby Oakland the next night. According to Gage, Griffin was discussing "the explosive testimony heard and experienced by . . . one hundred [first responders who] talked about sounds of explosions, hearing them being blasted around in the building before and at the onset of the destruction of the two Twin Towers." It was the first time that he had heard any alternative theory regarding the collapses, and he seized on the idea with enthusiasm. He began his own research and became convinced by what he found that the investigation into 9/11 had been incomplete.

Gage says Architects and Engineers for 9/11 Truth grew out of his initial efforts to persuade his fellow workers at an architectural firm.

> They kind of thought I was nuts, so I put this presentation together, this PowerPoint, and I showed them what I had learned a couple of months later. They all agreed with me. . . . Every one of the fifteen architects that I worked for who came to the

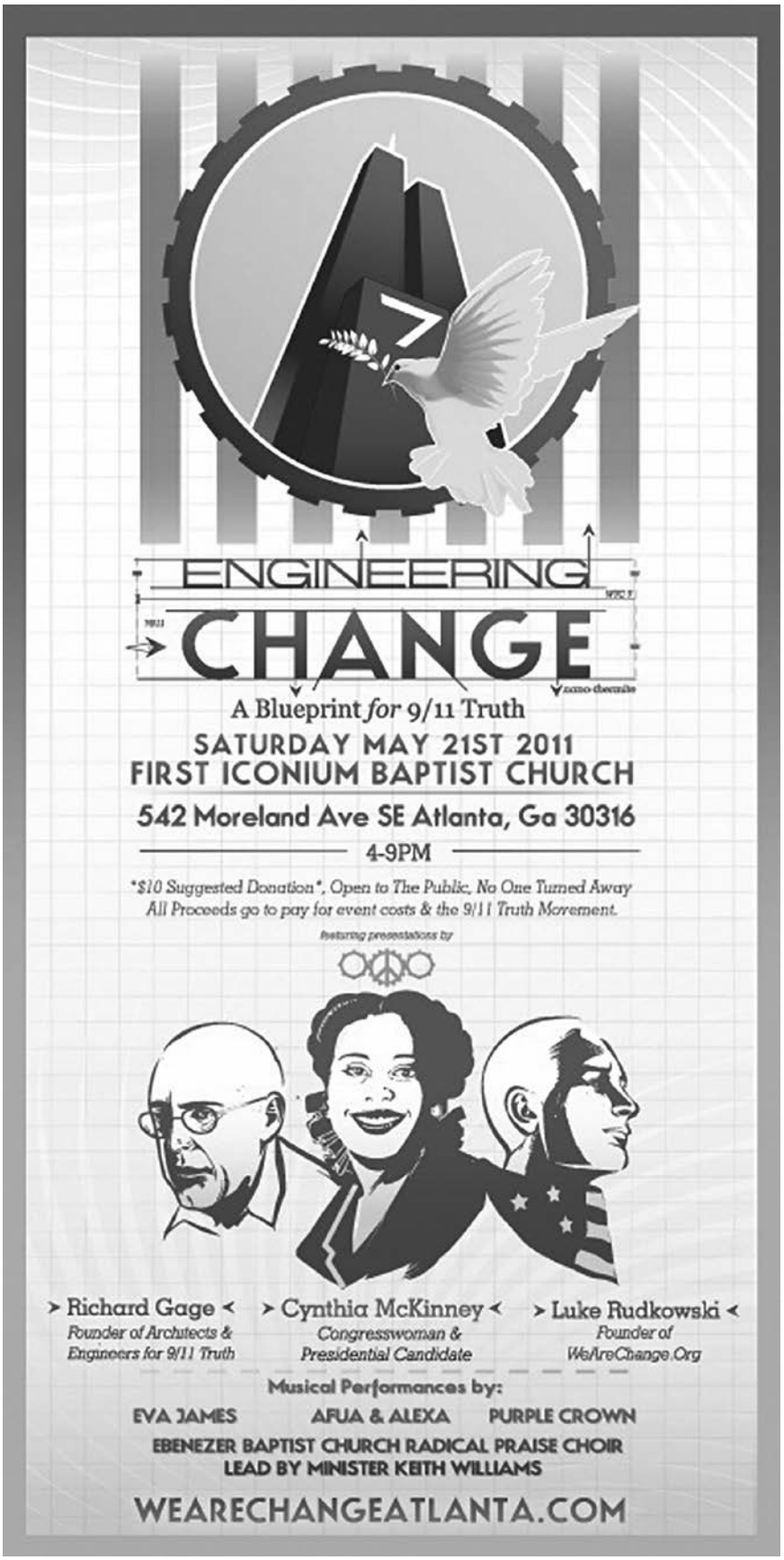
presentation agreed with me: "My god, you're right! These buildings were destroyed with controlled demolition!" Fourteen out of fifteen signed the petition.

Gage's group hopes to serve as a conduit for information about evidence that the media does not discuss. "Our goal, our mission," he tells me, "is to awaken, enlighten, inform the American people, other architects and engineers about the destruction of these buildings. . . . We're simply trying to inform the American people about this evidence, which is pretty indisputable, and get a new investigation."

I ask what an unimpeachable investigation would look like. "We would want it to examine all of the evidence," he says, "which the 9/11 Commission and the NIST report did not do—the evidence we'll be looking at today." He says a new investigation "would offer immunity to bring witnesses forward. It would be taken with subpoena power so that witnesses could be forced to testify, and testimony [would be] taken under oath. And using the scientific method relative to the evidence that we highlight in our DVD [*9/11: Blueprint for Truth*]."

I ask him about his best evidence for a controlled demolition.

He cites the apparent implosion of WTC 7 in six and a half seconds and at free-fall acceleration. While the engineers who studied the collapse and derived recommendations for enhanced building safety from their conclusions would dispute the accuracy of this statement as Gage presents it, it's a crucial element of the modern 9/11 Truth movement's narrative. "Suddenly on the afternoon of September 11," Gage tells me, "this building drops symmetrically, smoothly straight down into its own footprint, in the exact manner of a classic controlled demolition. . . . We are told that this is destruction by normal office fires, and if you look at the fires in that building they were . . . small and scattered." He also cites molten metal, including tiny iron spheres: "These iron spheres were created during the event; they are in all of the World Trade Center dust." In the same dust he claims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PURPLE CROWN
EBENEZER BAPTIST CHURCH RADICAL PRAISE CHOIR
LEAD BY MINISTER KEITH WILLIAMS
WEARECHANGEATLANTA.COM

Photo: Robert Blaskiewicz

Richard Gage speaking at the Engineering Change conference.

there is chemical evidence of thermite and a derivative, thermate. "We also find . . . nanothermite composite explosives, or pyrotechnics, found in all of the World Trade Center dust samples," he says, referring to a paper by Niels Harrit's team.[1]

I ask about the larger 9/11 Truth movement and whether there are any theories by other self-identified 9/11 Truthers that he rejects out of hand.

"Oh, yeah," he says earnestly. "There's somebody out there who's talking about directed energy weapons; there's somebody out there talking about mini nukes. We don't have evidence that stands up to scrutiny for either of those theories."

"Now, the essence of science," I begin, "is that you put forward a thesis that is falsifiable potentially. . ."

"I don't know what that means," Gage interjects.

I explain, "You could potentially prove something wrong, that this [thesis] is tentative until something else comes along, then I'll have to substitute my assertion with this new one that better fits the evidence. What would it take to dissuade you of controlled demolition?"

"Someone would have to explain how a forty-seven-story skyscraper [WTC 7] with 40,000 tons of structural steel designed with a safety factor of five can lose all of its columnar support simultaneously across all eighty columns and fall at free fall losing 400 structural steel connections per second over the six and a half seconds it took to fall. Someone has to explain that. No one has. Someone would have to explain the production of several tons of molten iron. No one has."

I ask him if he would be open to the idea that the collapse of WTC 7 actually took longer than the six and a half seconds on which he is basing his hypothesis.

"We are told in the fourteen seconds prior to the overall collapse there was an internal collapse, and we don't buy that, because if there was an internal cave-in of this building we would have seen massive deformation on the perimeter structure prior to its overall collapse, which occurs in six and a half seconds," Gage answers.

I point out that we did see a penthouse collapse long before the exterior collapse, which suggests that the building was collapsing internally and had substantially weakened long before the exterior collapsed.

"Any . . . collapse, even underneath the east penthouse," Gage insists, "would have caused massive deformation on the perimeter structure at that time. We didn't see any of that."

Architects and Engineers for 9/11 Truth has recently announced that 1,500 building professionals (architects and engineers in all fields of engineering) have signed its petition for a new investigation. Even if these were all American engineers, I argue, they would represent collectively only 9/100ths of 1 percent of the 1.6 million engineers in the country. How does he intend to reach the other 99.91 percent of engineers?

Gage explains his biggest barrier is engineers' "psychological resistance": "When we get them to sit in front of a presentation like this, or a half hour presentation which we do in their offices, 90 percent of them end up agreeing with us about the evidence."

"We don't have a conspiracy theory," Gage says as the interview concludes. "We only have evidence that we are presenting to the American people."

After our talk, Gage prepares to host a press conference. The attending press is, as far as I can tell, entirely made up of members of the alternative media who seem sympathetic to the speakers. I work my way up to a group at the front of the church and introduce myself to two of them, Bob Tuskin from BobTuskin.com and The Intel Hub (www.theintelhub.com) and Ed Sanders from Gators 9/11 Truth of Gainesville, Florida.[2]

I ask them about what brought them so far from home. "Well, we wouldn't miss this for the world," Tuskin says. He explains:

> People drive to all sorts of things . . . but something like this in our opinion should warrant our attention . . . because right now, ten years later, almost, from 9/11/2001 we still have not received the legitimate, mainstream investigation to the largest crime in our lifetimes. . . . We are here because we know what the facts are. We know that Building 7 fell at free-fall speed. We know that there is a consensus of architects and engineers as well as other likeminded individuals who are willing

> to hear out all of the evidence and not just look at the skewed perspective from the Zionist-controlled mainstream media.

Sanders shares a similar perspective. "It's clear the 9/11 Commission Report was very incomplete and misleading bordering . . . on scientific fraud, so it's time we bring the new investigation to the mainstream, and I hope people like you are able to help us in doing so."

I ask what a new investigation would look like.

Sanders answers this question. "I think the best place to start would be with the family members. I think that they are the people who have been most affected by the tragedy. It's obviously affecting the world as it is still ten years later with this trauma-based mind control." To clarify, Sanders doesn't think that the families themselves should do the investigations:

> Competent teams should be carrying out the investigation, and I would hope in a country like the United States that we'll have people with the capacity and ability to do a proper criminal investigation, just like we watch on *CSI Miami* and so many other criminal programs on television. It's just beyond me that we didn't care to look at a shred of evidence with a critical eye. We just called the whole event on a bogeyman, Osama bin Laden, [who] is now supposedly dead, and for the most part didn't care to actually look into what happened on that day.

Soon the press conference begins. The three main speakers (Richard Gage and fellow activists Manny Badillo and Luke Rudkowski) each in turn give synopses of their upcoming talks. It is at this point that we learn that Cynthia McKinney, a former member of Congress who was listed in the program, will not be joining us, as she is en route to North Africa to investigate the conflict in Libya.

Following the press conference, I lurk around the periphery of the church snapping photographs as Eva James sings her composition "Sharing the Truth" to her own guitar accompaniment. She dedicates it to Richard Gage. It's a folk song in the "disaster" genre, with the refrain:

> *You see cascading projections of steel*
> *into dust.*
> *It looked like demolition, but it's never*
> *discussed.*
> *So turn out the TV, and shut out the*
> *light*
> *'Cause it's all just illusions, in front of*
> *my eyes.*
> *Well, I'm not scared of dyin'*
> *We're all bound for heaven,*
> *I'm just sharing the truth,*
> *About nine-eleven.*[3]

When I reach the other side of the church, I spot a pair of Alex Jones shirts and decide to interview their owners. I introduce myself to Linda Evans and her friend Melanie. I ask Evans, who is sitting beside me, how she came to the 9/11 Truth movement: "Ever since I got into Ron Paul four years ago, I . . . it's opened up a whole new world of information to me." I have seen a lot of Ron Paul buttons and shirts at the event, so I ask her what the association is between Ron Paul and the 9/11 issue. She replies instantly: "The truth." When I follow up with a question about Ron Paul's stance on 9/11 and whether he supports a new investigation, she says, "I'm not sure." She pauses. "Yeah, I'm sure he would."

Evans is disappointed that Cynthia McKinney is not here, but now she is really interested in Manny Badillo, even though she had never heard of him before the press conference. I ask her if she has a theory about what happened on 9/11. She says that she does not think that it is a theory but the truth. "I think it was [the] Israeli Mossad with a faction of our CIA and Dick Cheney in the bunker telling the Air Force to stand down. That's what I think it is."

I ask about her evidence for the Israeli Mossad connection.

She considers her response for a moment: "Well, there's a lot of complications with that whole thing. I don't even know where to start, there's so much, and you don't want to sound like an anti-Semite, but there is a faction of the Israelis, the Zionists, that run our country."

"So you would say that our country is run by Zionists?"

"Yeah. Well, that and corporations."

Gage's talk then begins. He opens by asking the audience how many of them believe the official story. Of the 180-ish people there, I am the only one in the entire place who raises my hand. Linda looks at me, clearly surprised. "And I was talking to *you*?" she asks, almost jokingly. In a subsequent poll question, twenty-three people say they are "undecided" about the official story.[4]

Gage gives his talk and accompanying presentation and then goes deeper into many of the points we covered in our interview. The presentation is quite epic, on the order of some seven hundred slides (the DVD version of the talk, *9/11 Blueprint for Truth*, which I picked up many months ago at a previous event, is just over six hundred slides and can also be viewed online at http://bit.ly/m55GSz). The accompanying talk

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is quite polished and well delivered, and the crowd reacts well. At the end of the lecture, Gage takes another poll; of the twenty-three attendees who were undecided, only three remain.

After a local artist, Purple Crown, performs his song "Born into War,"[5] which is replete with references to 9/11, vaccines, and food additives, Rudkowski of WeAreChange.org takes the podium. Rudkowski is described in the conference program as a practitioner of "bold activist journalism," and he occasionally appears on the channel Russia Today and *The Alex Jones Show*. If he's a journalist, he seems to not break stories or land interviews. Instead, he makes his way into private events posing as a journalist and confronts people he identifies as members of the New World Order. Then he records them looking befuddled. For instance, in a video clip that he is previewing for the first time at this conference, Rudkowski confronts Henry Kissinger at some social event. Rudkowski badgers Kissinger for words of forgiveness for all his horrific crimes. Kissinger just turns his back on him. When Kissinger leaves, Rudkowski hops into a cab and follows Kissinger to what I take to be his residence in order to badger him some more. It is hard to see what substantive political point has been made, and Rudkowski strikes me as a sort of journalistic Crocodile Hunter, a television clown ambushing unsuspecting public figures and thoroughly annoying them. I am uncomfortable watching the video and am deeply embarrassed for Rudkowski.

Perhaps the most dynamic speaker is Manny Badillo. He is outreach director of New York City Coalition for Accountability Now (NYCCAN), which he describes as the "only family member, first responder, and survivor organization that wants the comprehensive and factual investigation that we all deserve." Badillo's uncle was killed in the attacks. He is frustrated that his group's petition to have a question placed on the New York ballot that asked, according to Badillo's speech, "Would you support a comprehensive and factual investigation into the event of September 11th—yes or no?" was shot down by the New York Supreme Court. He says that the court's decision was "based on technicalities."[6]

"Over and over again," Badillo says, "I see these specials they have on [television about] 9/11 and it's harrowing and it's awful, because they never touch upon the facts of the case. It's all so emotionally driven." In almost the next breath, however, he denounces the city's plans to build a memorial: "From what I understand, the vast majority of this museum-slash-memorial is going to be a museum, and how *dare* they further disrespect the family members? How *dare* that we still have to go through this?"

So much for condemning emotional appeals, I think.

The conference has run a little behind schedule, so we adjourn immediately after the question and answer period and skip the "Tithe for Truth" listed in the program. The organizers have rented out a nightclub across the street, and I plan to tag along and spend a night out with the 9/11 Truth community. ■

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An expanded report, "You Can't Handle the Truthiness," including more extensive interviews, may be found at **www.csicop.org.**

Notes

1. The paper in question is Niels Harrit et al.'s "Active Thermitic Material Discovered in Dust from the 9/11 World Trade Center Catastrophe" (*The Open Chemical Physics Journal*, Volume 2, 2009). According to the editor of the journal, the paper had not been submitted for peer review, and she resigned in protest, saying: "I cannot accept that the issue is put in my journal. The article is not about physical chemistry or chemical physics, and I could well believe that there is a political point of view behind the publication. If anyone had asked me, I would say that the article should never have been published in this journal. Period." See Thomas Hoffman's "Editor Resigns after Controversial 9/11 Article," available online in Danish at http://videnskab.dk/teknologi/chefredaktor-skrider-efter-kontroversiel-artikel-om-911.

2. This interview was in fact filmed by Tuskin and later released on his YouTube channel. The entire interview may be viewed at http://bit.ly/iU0ggw.

3. Video of Eva James's performance can be found at http://bit.ly/mUBXTJ. It is just one example of an entire genre of 9/11 filk.

4. Architects and Engineers for 9/11 Truth keeps a tally of this poll for many of the events at which Gage presents. It may be found at www2.ae911truth.org/speakings.php#speakpast.

5. The official YouTube video of Purple Crown's "Born into War" can be viewed at http://bit.ly/cPi7py.

6. In October of 2009, New York Supreme Court Justice Edward Lehner affirmed the findings of the city's referee, who had reviewed and rejected the NYCCAN petition. The referee found that the petition to create an investigative commission with subpoena power was inconsistent with the existing law with respect to financing the commission, staffing it, and its jurisdiction, as well as compliance with New York transparency laws, the constitutional right to indictment by grand jury, and with respect to the petition's proposal to confer prosecutorial immunities upon committee members. The petition was so deeply flawed that its severability clause could not salvage any part of it; the city didn't even pursue its original finding that NYCCAN had failed to secure enough legitimate signatures. *Burke v. McSweeny*, No. 110779/09 (Supreme Court of the State of New York, County of New York, October 8, 2009).

The Life and Death of 'Living God' Sathya Sai Baba

Sathya Sai Baba, a living god for nearly forty million people, died in April. He had a nine-billion-dollar organization and religious centers throughout the world. Who was Baba? Why was he thought to be a god?

RYAN SHAFFER

Sathya Sai Baba died in April 2011 after illness due to respiratory and kidney problems. He was a "living god" for nearly forty million people worldwide, and his believers have credited him with resurrecting the dead and healing the sick. To his Hindu followers, Baba was an avatar, or an incarnation, of a god who performed miracles, including materializing jewelry and *vibuthi* (holy ash) out of thin air. With schools in more than thirty-three countries and educational programs in 166 countries, Baba became a global figure despite having left India only once (to visit Uganda in 1968). His supporters, including high-profile Indian politicians and American businessmen, proudly celebrated his mystical feats and humanitarian efforts. But his critics denounced him as a fraud for decades, claiming his feats were common magic tricks. Later, former followers accused him of child molestation, after which the U.S. government issued travel warnings to its citizens about the allegations.

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Sathya Sai Baba was born in 1926 in Puttaparthi, India. At fourteen, he declared he was the reincarnation of Sai Baba of Shirdi (1835–1918), an Indian guru who remains a popular Hindu figure and was rumored to levitate, read minds, and even heal the sick. In the 1940s, Baba began attracting attention when he started "materializing" items out of thin air. He then began traveling throughout South India building a following (Babb 1991). His celebrity was cemented when Americans traveled to India on spiritual voyages in the 1960s. In the past several years, Baba established many centers in the United States. For example, the USA Sai Organization lists eight locations in New York and twenty locations in Southern California.

Besides being a spiritual guru, Baba was well-connected politically in India, with high-profile believers in the two major parties: the right-leaning Bharatiya Janata Party (BJP) and the left-leaning Indian National Congress (INC). These included former Prime Ministers A.B. Vajpayee and P.V. Narasimha Rao (Goldberg 2005). Journalist Khushwant Singh explained Baba's ties to politicians in the 1995 documentary *Guru Busters*: "At many times some decisions and particularly the [political] appointments are made in consultation with him . . . people like Sai Baba have a national influence." In the documentary, T.N. Seshan, then chief election commissioner of India, held up a ring Baba gave him and said, "He gave this ring out of nowhere, which is set with nine gems; there is a ruby in it, a pearl in it, sapphire in it,

AFP PHOTO/Dibyangshu SARKAR/FILES

Indian police officials spread the national flag on the transparent casket containing the body of Hindu guru Sathya Sai Baba.

there is an emerald in it, there is a diamond in it . . . he realized this for me out of nowhere." Seshan later explained, "I am not a jumbly person. I've got a master's degree in physics; I have a master's degree in administration economics from Harvard. I find nothing contradictory between the physics and the fact that I believe this [ring] came out of the blue."

By 2011 the state's tax department estimated the worth of Baba's Sathya Sai Central Trust at about nine billion dollars. One of the Trust's most notable projects was the building of the Sri Sathya Sai Institute of Higher Medical Sciences in Puttaparthi with donations, including a twenty-million-dollar contribution from Hard Rock Café and House of Blues cofounder Isaac Tigrett. In mid-June, nearly two months after Baba's death, 216 lbs. (98 kg) of gold, 676.8 lbs. (307 kg) of silver, and about $2.5 million in cash were discovered in Baba's personal chamber after it was opened for the Trust to inventory items ("98 kg Gold Found . . ." 2011).

Baba's critics and former followers accused him of serious crimes. P.C. Sorcar Jr., a well-known Indian magician, has been a Baba critic for several years. In 2000, Sorcar explained that Baba's miracles, such as making *vibhuti* (holy ash) appear, are "common tricks" using sleight of hand ("P.C. Sorcar: Baba's a Bad Trickster" 2000). In that example, he says, the holy ash is from a capsule hidden in the palm of Baba's hand, which is then crushed with his thumb to make the ash appear. Likewise, Basava Premanand (1930–2009), one of the most respected Indian rationalists, started investigating Baba in 1968. Premanand, who was the head of Indian Skeptics and wrote thirty-five books (five in English), devoted years to examining Baba (Polidoro 2003). He released his findings about the sleight-of-hand techniques used in Baba's "miracles" to the public as early as 1976.

Perhaps more damaging was Tal Brooke's 1970 book *Lord of the Air* (later called *Avatar of Night*), which recounted the author's doubts about Baba upon learning of his sexual activities with young boys. The allegations did not go away. In 2004, stories of sexual abuse and child molestation surfaced in the BBC2 documentary *The Secret Swami*, in which journalist Tanya Datta interviewed former Baba devotees in the United States who said they had been sexually abused by him. The documentary featured interviews with government leaders who called the claims "baseless." On the other hand, the U.S. State Department issued a travel warning in 2001 about "inappropriate sexual behavior by a prominent local religious leader" and later confirmed it was referring to Baba (Lewis 2006).

Datta's report also explored a strange and still unexplained event in 1993. On June 6, 1993, four boys supposedly entered Baba's bedroom with knives and were shot to death by local police. The police claimed they had to fatally shoot the boys after the boys attacked them with knives. A report from the Central Bureau of Investigation (CBI), India's organization to investigate corruption and special crimes, discovered flaws and contradictions in the police reports, and it was rumored that police killed the four boys in cold blood. Datta said, "Some police officers were arrested but never charged. The case was eventually dropped." She further reported, "Critics say police connections ensured that Sai Baba wasn't even interviewed, despite being one of the witnesses to the events of that night." Attempts by the former Home Secretary to reopen the case were unsuccessful, and the reasons behind the killings as well as the boys' motives for entering Baba's bedroom remain unknown. Premanand later published a book titled *Murders in Sai Baba's Bed Room* that discussed the CBI's description of the police cover-up and destruction of evidence.

On April 24, 2011, Baba died at the age of eighty-five. His death was likewise full of controversy. For one, Baba's death contradicts his prediction posted on his website: "He is expected to leave His body [in] 2019" (International Sai Organization 2011a). After he was put on life support, medical specialists from the United States, Britain, and Australia traveled to Puttaparthi to help Baba. On April 5, as rumors of his illness spread, hundreds of devotees attempted to break into the hospital and attacked officials "for not allowing them to have a glimpse of the ailing Baba" (Das 2011). The next day, doctors

reported progress when Baba's alertness improved, but the state government worried about the impact of the organization becoming leaderless. Knowing the region was dependent on Baba, it sent a five-member team "to find out whether there is any system in place for running the scores of charitable schemes" created by Baba under the trust ("Andhra Govt Team . . ." 2011).

While Baba remained in the hospital, a miracle was proclaimed with followers and reporters flocking to see a four-foot wax figure of Baba "oozing perfumed oils from its feet" (Kumar 2011). The *Times of India* noted, "Devotees refused to consider that the wax idol could be melting in the sweltering heat and the oil was a resultant residue" (Kumar 2011). The same day, the *Deccan Herald* noted that the "idol stopped releasing the liquid after it was shifted to the ground floor of the residential complex" ("Axe Effect of Baba Wax Statue" 2011).

The next day, Baba's liver stopped responding to treatment and he was pronounced dead due to multiple organ failure. The faithful flocked to Puttaparthi, paying their respects in prayer, and a memorial service was held with full state honors. In attendance were governors from two Indian states, four former or current chief ministers, and two Andhra Pradesh ministers (Krishnamoorthy 2011).

Baba's death likely won't bring an end to any controversy about his activities or supposed "miracles." Many people are dependent on Baba's humanitarian organization for free medical care and drinking water. With his unexpected death, it remains unclear what will happen to his organization and those who rely on it. One prediction is that there will be at least one person who will claim to be the third incarnation of Sai Baba. How that person will be received by Sathya Sai Baba's followers is anyone's guess. But an important lesson about supernatural claims can be learned from this case. During my 2010 visit to India, I was told a story by Lalitha Rajaram, who attended a Baba event in Delhi as a young girl decades ago. At the event, she was told by her friend to watch Baba carefully so as not to miss anything he did. She concentrated on Baba, closely following his movements with her eyes. Her concentration was abruptly shattered when Baba, through his handlers, told her to leave. Rajaram surmised that Baba saw her in the audience and, being wary of skeptics, did not want her there. Why would a god not want someone to watch him closely? More than likely because he was not a god but rather a human who lived within the laws of physics like the rest of us. ■

> The U.S. State Department issued a travel warning in 2001 about "inappropriate sexual behavior by a prominent local religious leader" and later confirmed it was referring to Baba.

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In Search of the Emerald Grail

In the old-town portion of Genoa, Italy, the city where Christopher Columbus was born, stands the great Romanesque-Gothic cathedral of San Lorenzo (Saint Lawrence).[1] Here in the subterranean Museum of the Treasury—which houses reputed pieces of the True Cross, relics of John the Baptist, and other religious objects—is displayed *Il Sacro Catino*, "The Holy Basin." This is one of the most famous embodiments of the legendary "Holy Grail," and I was able to study both it and its legend there in the fall of 2009 (figure 1), attempting to resolve some of the mysteries and controversies concerning it.

Grail Legends

Romantic stories about the quest for the *San Gréal*, or "Holy Grail"—reportedly the cup used by Jesus at the Last Supper—have proliferated for centuries. Popularly, the Grail (originally the word meant "dish") is the talisman sought by the knights of King Arthur's Round Table. The quest is known to English audiences largely though French romances compiled and translated by Sir Thomas Malory in his *Morte d'Arthur* in 1470. Therein the Grail is represented as the chalice from which Jesus and his disciples drank at the Last Supper and which was subsequently used to catch and preserve his blood from the Crucifixion. This act was usually attributed to Mary Magdalene or Joseph of Arimathea (the latter having claimed Jesus's body for burial—see Mark 15:43–46).

The earliest Grail romance is *Le Conte du Graal* ("The Story of the Grail"), which was composed by Chrétien de Troyes around 1190. It describes how, when a girl "entered holding the grail, so brilliant a light appeared that the candles lost their brightness like the stars or the moon when the sun rises. . . . The grail . . . was made of fine, pure gold, and in it were precious stones of many kinds. . . ." Two other grail stories, both written by Robert de Boron circa 1200, were *Joseph d'Arimathie* and *Merlin*. These gave the Grail quest a new Christian focus, representing it as a spiritual rather than chivalrous search. This epic constitutes the most important and best-known English version of the Arthurian and Grail adventures (Barber 2004, 19; Cox 2004, 75–76).

Other legends represent the Holy Grail variously as a silver platter, a miraculous cauldron or dish of plenty, a salver bearing a man's severed head (like that of John the Baptist in Matthew 14:3–12), or a crystal vase filled with blood. Over time the Grail has also been represented as a reliquary (containing the Sacred Host or holy blood), a secret book, an effigy of Jesus, the philosopher's stone, and many other portrayals. Around 1205 in a Bavarian poem titled *Parzival,* it was described as a magical luminous stone, more specifically as an emerald from Lucifer's crown that had fallen to earth during the struggle in heaven. The term *Holy Grail* now popularly refers to any object of a quest, usually an unattainable one (Nickell 2007, 50–53).

The Historical Evidence

Unfortunately, there is no story about Joseph of Arimathea and the Holy Grail in any text until the close of the twelfth century, when Robert de Boron penned his romance. Notably, the Gospel accounts of Jesus's death do not suggest that Joseph or anyone obtained a dish or other vessel from the Last Supper and used it or any other receptacle to preserve Jesus's blood. Records of the Holy Blood—the reputed contents of the cup Joseph possessed—are also of late vintage, perhaps the earliest coming from Mantra, Italy, in 804 (Nickell 2007, 53–56).

Nevertheless, several vessels lay claim to being the true Holy Grail—some twenty of which had surfaced by the sixteenth century. John Calvin ([1543] 2009, 62, 63) reported on several of the rival claimants for the title of "the cup in which Christ gave the sacrament of his blood to the apostles" (at the Last Supper). Calvin mentioned one at Notre Dame de l'Isle, near Lyons; another was in a monastery in the Albigéois; still another could be found at Genoa. This was "a vessel or cup of emerald" so "costly," says Calvin sarcastically, that "our Lord must have had a splendid service on that occasion." (See also my introduction to Calvin [1543] 2009, 32–33.)

The Emerald Bowl

Calvin is clearly referring to *Il Sacro Catino*, "The Holy Basin." Most sources allege that this vessel—actually an emerald-green, hexagonal bowl—was brought to Genoa by Guglielmo Embriaco, following the conquest of Caesarea in 1101.[2] A fresco on the main façade of the Palazzo San Giorgio (figure 2) depicts crusader Guglielmo ("William" in English) holding as war booty the distinctive *Catino*. Twelfth-

century writers acknowledged the purported intrinsic value of the bowl. For example, William of Tyre noted circa 1170 that it was "a vase of brilliant green shaped like a bowl" and that "the Genoese, believing that it was of emerald, took it in lieu of a large sum of money and thus acquired a splendid ornament for their church." He adds, "They still show this vase as a marvel to people of distinction who pass through their city, and persuade them to believe it is truly an emerald as its color indicates" (quoted in Barber 2004, 168).

Others have seemed even more skeptical. States George Frederick Kunz in his *The Curious Lore of Precious Stones* ([1913] 1971, 259):

> A queer story has been told regarding the Genoese emerald. At one time when the government was hard pressed for money, the Sacro Catino was offered to a rich Jew of Metz as pledge for a loan of 100,000 crowns. He was loath to take it, as he probably recognized its spurious character, and when Christian clients forced him to accept it under threats of dire vengeance in case of refusal, he protested that they were taking a base advantage of the unpopularity of his faith, since they could not find a Christian who would make the loan. However, when some years later the Genoese were ready to redeem this precious relic, they were much puzzled to learn that a half-dozen different persons claimed to have it in their possession, the fact being that the Jew had fabricated a number of copies which he had succeeded in pawning for large sums, assuring the lender in each case that the redemption of the pledge was certain.

Be this anti-Semitic folktale as it may, the *Catino* was pawned in 1319 and redeemed in 1327 (Marica 2007, 7; "The Dish of the Last Supper" 2010). It is still owned by the municipality of Genoa (Marica 2007, 12).

In any event, the *Catino* is not made of emerald—no matter how much its color and hexagonal shape give it the appearance of a faceted gemstone. At about fifteen inches in diameter it would have been an immense emerald indeed! Actually, according to the museum's guidebook (Marica 2007, 12), it is sim-

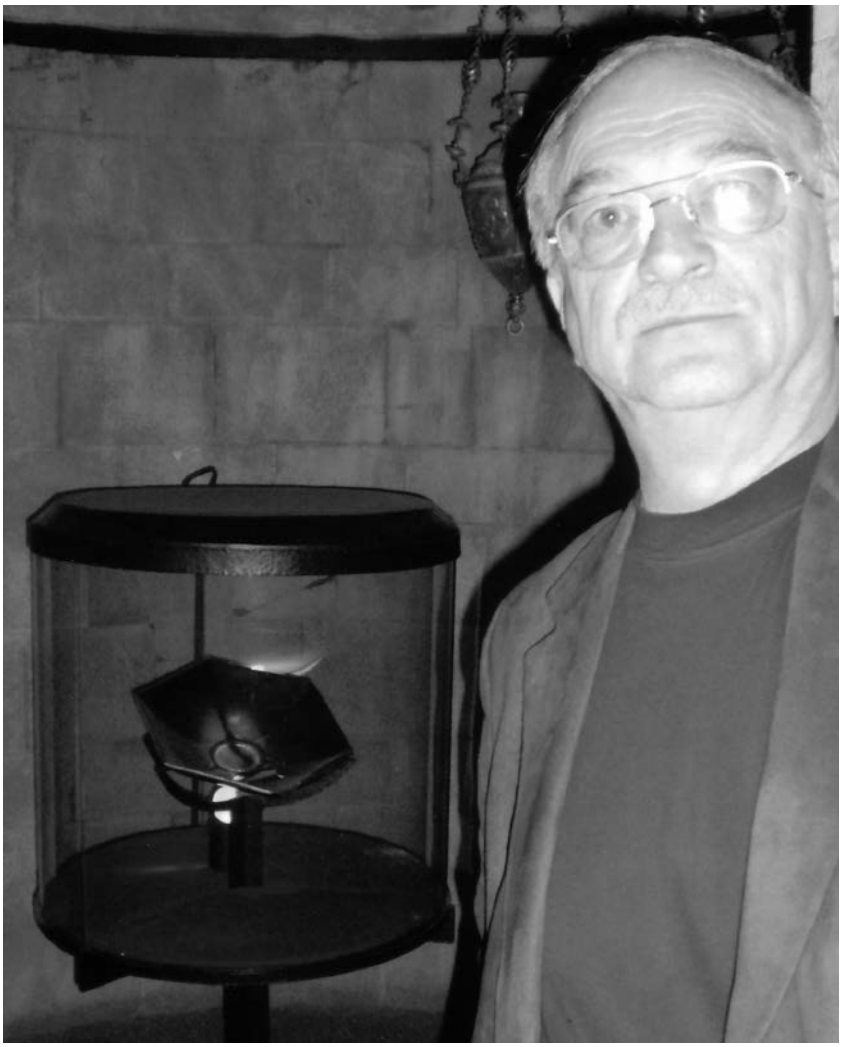

Figure 1. In Genoa, the author poses with *Il Sacro Catino* (" The Holy Basin"), long believed to be the Holy Grail.

The *Catino* is not made of emerald—no matter how much its color and hexagonal shape give it the appearance of a faceted gemstone.

Figure 2. A Genoese palace fresco depicts Guglielmo Embriaco, merchant and military leader, with the *Catino* as war booty.

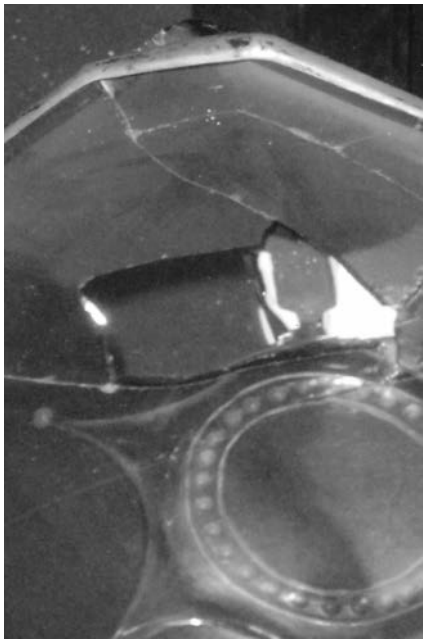

Figure 3. Supposedly made of emerald, the *Catino* was broken in the early nineteenth century, disproving the claim. (Photos by Joe Nickell)

ply of "mould-blown green glass." Its manufacture is said to be Egyptian (Barber 2004, 168) or ninth-century Islamic (Marica 2007, 12), or possibly later.

Its glass composition was revealed when it became broken (figure 3). According to the 1910 *Encyclopedia Britannica* (s.v. "Genoa"), the *Catino* "was long regarded as an emerald of matchless value, but was found when broken at Paris, whither it had been carried by Napoleon I., to be only a remarkable piece of ancient glass." (Another view is that it was broken on its return to Genoa [Marica 2007, 7], and a 1914 *New York Times* story claimed—possibly because of erroneous translation—that it had just been "accidentally broken" and was "beyond the possibility of repair" ["'Holy Grail' Shattered" 1914].) In any case, the bowl was restored in 1908 and again, finally, in 1951, when it received the metal armature that holds the pieces together ("The Dish of the Last Supper" 2010; Marica 2007, 7). (A rumor claims that the missing piece—again see figure 3—was kept in Paris in the Louvre ["The Dish of the Last Supper" 2010].)

Unholy Grail

When the belief that the *Catino* was made of emerald was broken to pieces, so was the claim that it was the Holy Grail. Its alleged Christological link was asserted long after the bowl arrived in Genoa, and *it was predicated on the basis of its supposed emerald composition*. This leap of faith was made by Jacopo da Voragine, archbishop of Genoa and author of *Legenda Aurea* (*Golden Legend*).

In a chronicle of Genoa written at the close of the thirteenth century, Jacopo, believing the vessel was indeed made of emerald, linked it to one of the Grail traditions. He cited certain English texts that claimed that Nicodemus had used an emerald vessel to collect Jesus's blood when his body was placed in his tomb and that these texts called it "Sangraal"—that is, "Holy Grail" (Marica 2007, 7; Barber 2004, 168).

Alas, there is nothing to credibly connect the *Sacro Catino* to a first-century Grail, and the same may be said of other supposed Grail vessels. Indeed, observes Barber (2004, 170), "there is little or no evidence that anyone claimed in the thirteenth century to possess the Grail." Certainly, claims for all such vessels date from after the period when most of the Grail romances were penned: between 1190 and 1240 (Nickell 2007, 60). This realization should put an end to fanciful Grail quests, but it probably will not: witness the popularity of such books as *The Da Vinci Code* (Brown 2003) and the book on which its author drew heavily, *Holy Blood, Holy Grail* (Baigent et al. 1996)—silliness all. ■

Acknowledgements

I appreciate the help I received from Massimo Polidoro, who in 2009 not only saw to it that I was invited to Italy's largest science festival, held in Genoa, but who, with other skeptics including Luigi Garlaschelli, accompanied me to the Cathedral of San Lorenzo. CFI Libraries Director Timothy Binga and CFI visiting scholar Christina Stevens provided valuable research assistance.

Notes

1. St. Lawrence was a deacon of the Roman Church, martyred during the persecution of Valerian in 258.

2. Another source reports that the bowl was booty from Almeria, Spain, taken in 1147. (See Marica 2007, 7.)

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The Myth of Chastity Belts

According to tradition, the use of chastity belts—metallic straps locked over female genitalia with padlocks—dates back to the time of the Crusades, when knights in departure for the Holy Land supposedly used them to ensure their wives' fidelity in their absence. Recent studies, however, show that such instruments were never in use during the Middle Ages.

There are in fact some logical problems with the use of such belts, chief among them hygiene: even if the belts had small holes for bathroom functions, such devices would soon cause wounds followed by infections, serious sepsis, and finally death. Furthermore, it is quite plausible that before leaving the knights would sleep one last time with their wives, maybe hoping to find a baby on their return. It is quite obvious that a locked chastity belt would have prevented any birth. And finally, the most obvious problem: any medieval lock could be opened by a locksmith in a few seconds.

In addition to such logical faults, the fact that medieval chastity belts are just a legend is suggested by the absolute absence of such belts that can be dated back to the Middle Ages.

Figure 1. This sixteenth-century engraving of a woman in a chastity belt is attributed to Sebald Beham.

Abstinence

The idea of sexual abstinence is certainly quite old. The Latin term for chastity belt, *cingulum castitatis*, appeared in some works by Gregory the Great, Alcuin of York, St. Bernard of Clairvaux, and Nicolas Gorranus start-

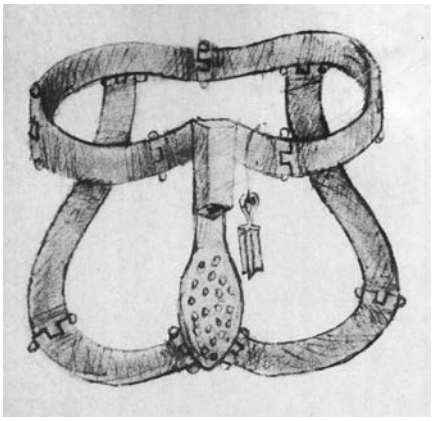

Figure 2. Konrad Kyeser's 1405 military encyclopedia the *Bellifortis* contains the first visual depiction of an object that vaguely resembles a chastity belt.

ing in the fifteenth century. However, in all such cases it is meant as a symbol of moral purity, not as a physical object.

The concept of a fidelity pact between lovers appears in poems of the twelfth century, such as the "Lai of Guigemar" by the famous poetess Marie de France. In this tale, when Guigemar departs from the woman he loves, they exchange love tokens: the woman ties a knot in his shirt that only she can untie, while the knight ties a tight girdle around her loins that only he knows how to untie. Thus they can become lovers with others only if they cut off their clothes. But, as it can be seen, this is a symbolic pact and, significantly, it is the woman who initiates it.

In order to find the first visual depiction of an object that vaguely resembles a chastity belt, we need to look to a 1405 codex, Konrad Kyeser's military encyclopedia the *Bellifortis*. Among descriptions of weapons, catapults, and torture devices, an instrument that resembles armor more than a chastity belt (figure 2) is presented as being used "unto the women of Florence." However, Kyeser's tone is ironic; he in fact writes: "These are hard iron breeches of Florentine women which are closed at the front. Padlocks unto the four-legged creatures, breeches unto the women of Florence, A joke binds this lovely series together, I recommend them to the noble and obedient youth." This, then, would imply that even if the device really existed in the fifteenth century, it was certainly quite rare. Surely there are no traces of such apparatus in the Florence of the times.

A sixteenth-century engraving attributed to Sebald Beham, a minor German master, shows a woman wearing a "chastity belt" locked with a padlock, standing between two men giving her money (see figure 1). An interpretation given for the engraving is that she is a prostitute standing between her protector and a client. So, even if the belt was an actual physical object rather than a metaphorical concept, it is represented in the Beham engraving merely as a professional instrument and not as a constriction by a jealous lover.

Fakes

The earliest known "real" chastity belts date to around 1840 and are found today in the museums of Europe. For example, at the Musée de Cluny in Paris, devoted to medieval art, until recently one could find a belt that was said to have belonged to Catherine De Medici. It was only in 1990 that the museum's curators noted that the object was most likely a forgery from the nineteenth century. Another piece from the British Museum in London, originally thought to date to the sixteenth century, was recently established to be from the 1840s and removed from the exhibition.

It is only in the nineteenth century, especially in countries like England and the United States where Puritanism was again in vogue, that chastity belts became widespread. However, these were more refined and were meant to be worn for only a short time, used by working women with the purpose of avoiding rape or imposed on adolescents in order to prevent masturbation, which was considered bad for the health (or at least for the soul) by the bourgeois moral hypocrisy.

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The Psychical Researcher

The historian primarily responsible for the creation in the twentieth century of the myth of medieval chastity belts is none other than Eric John Dingwall, who in 1931 published his monograph *The Girdle of Chastity* (still in print today). Dingwall is quite famous in psychical research history. He worked with both the British Society for Psychical Research and its American counterpart. He conducted celebrated investigations on such mediums as Eva C., Eusapia Palladino, Margery, and the Schneider brothers. He was friends with Houdini and an accomplished magician himself who was not easily fooled by the deceptions that some pseudo-psychics employed. He also contributed to the debunking of the Borley Rectory "haunting" case. And yet he was convinced that chastity belts really existed in the Middle Ages. "As a monument of human folly," he wrote in his book, "the girdle of chastity is a good example: as an indication of the lengths to which jealousy unchecked will lead it is unique." Not so. However, he can be excused, for in his time some of the belts on display in museums, and whose pictures are included in Dingwall's book, were still thought to be authentic. At that time it was impossible to date them with accuracy.

Furthermore, in Dingwall's defense, it can also be said that chastity belts were actually publicized in medical journals of the early twentieth century as a means to ensure fidelity, which helps explain how one of the many myths attributed to the Middle Ages became reality in modern times. ■

[THINKING ABOUT SCIENCE MASSIMO PIGLIUCCI

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On Miracles—Again

Arguably, one of the most oft-repeated mantras in the skeptic community is "Extraordinary claims require extraordinary evidence," the modern rendition of David Hume's idea that "a wise man proportions his belief to the evidence." Hume wrote about adjusting belief according to the available evidence in his famous essay "Of Miracles," published in 1748 as part of his *Enquiry Concerning Human Understanding*. I discussed this topic in this column back in 2005 (SI's March/April issue, 14–15), but because Hume's dictum is a crucial component of modern skepticism, and also because the three hundredth anniversary of the famous philosopher's birthday has just been celebrated throughout Europe, it is perhaps worth taking another look at what the principle entails and why we still think it is worth our attention today.

Hume's analysis was based on his definition of *miracle*, a definition that actually applies to many areas of inquiry in skepticism and can easily be extended to occurrences that, while not strictly miraculous, are nonetheless extraordinary enough to fall under Hume's analysis. For the Scottish philosopher, "a miracle is a violation of the laws of nature; and as a firm and unalterable experience has established these laws, the proof against a miracle, from the very nature of the fact, is as entire as any argument from experience can possibly be imagined."

David Hume

This passage has occasioned much misunderstanding. (Two good references for those interested in the philosophical controversy and modern interpretations of Hume's reasoning are Jordan Howard Sobel's "On the Evidence of Testimony for Miracles" and David Owen's "Hume versus Price on Miracles and Prior Probabilities," both of which appeared in the April 1987 *Philosophical Quarterly*.) In particular, disagreement often focuses on the word *proof*, which if interpreted in contemporary terms seems to imply absolute certainty. But it is easy to show that Hume was not endorsing certainty in any matters, as is clear from the context of all of his writings, and that the word *proof* was used by philosophers of the time to indicate what we today would call the degree of probability or likelihood of a proposition. Indeed, Hume explicitly says that "in our reasoning concerning matters of fact, there are all imaginable degrees of assurance, from the highest certainty to the lowest species of evidence."

So, let's consider the report of a miracle (or a UFO or a ghost). Hume begins by pitting two types of experience against each other: the fact that we almost never observe miracles (or UFOs or ghosts) against a new report of just one such experience. An initial analysis gives us good reason to be skeptical of the extraordinary claim, because the unextraordinary explanation starts out with a very large degree of support from our experience. But obviously we cannot leave things there; otherwise we would never accept the discovery of any new phenomenon on the simple basis that we hadn't encountered it before.

At this point Hume differentiates truly extraordinary events from simply rare occurrences: "It is no miracle that a man, seemingly in good health, should die on a sudden: because such a kind of death, though more unusual than any other, has yet been frequently observed to happen. But it is a miracle that a dead man should come to life; because that has never been observed in any age or country." For readers inclined to see things in a Bayesian framework—one of the most powerful modern approaches in both probability theory and epistemology—this can be translated in the following fashion. The prior probability of, say, a sudden heart attack is non-negligible depending on the frequency with which such events take place in the general population. In contrast, the prior probability attached to a violation of the laws of nature (or even to a paranormal phenomenon) has to be very low simply because we have never reliably observed such an event, nor do we have any good reason to believe that it can occur (however, again, its probability cannot be exactly zero; otherwise we would be absolutely certain of the impossibility of the event, and no amount of new information could possibly change our belief—the very definition of a closed-minded position).

It isn't impossible to have sufficient evidence to believe in miracles (or paranormal phenomena)—it just takes an extraordinary amount of it for that belief to become reasonable.

What about the probabilities to be attached to the testimony of an unusual or miraculous event? Hume tells us that "a general maxim worthy of our attention [is] that no testimony is sufficient to establish a miracle, unless the testimony be of such a kind, that its falsehood would be more miraculous than the fact which it endeavors to establish." Again, we see echoes of Bayesianism, even though scholars are fairly certain that Hume did not know of Reverend Bayes's work (despite the fact that Bayes died in 1761 and his seminal essay was published posthumously in 1763, when Hume was alive and well). We are now talking about likelihoods: the probability that the testimony is correct assuming that the event actually occurred. According to Bayes's theorem, the priors multiplied by the likelihood are proportional to the posteriors (the probability that the event occurred given the evidence) like this: P(M|T) ~ P(T|M) * P(M). This means that the probability of a miracle occurring given the testimony is proportional to the probability of the testimony given the miracle occurred times the prior probability of the miracle. If one standardizes these quantities, one may substitute the equal sign for the proportionality. To simplify: uB ~ nE * pB (updated Belief is proportional to the product of new Evidence and prior Belief).

So Hume's idea can be recast in these terms: if the priors are already high (as in the case of a man suddenly dying of a heart attack), the testimony need not be particularly overwhelming (moderate likelihoods will do) for us to believe that the event occurred (medium to high posteriors). But if the priors are very low (a miracle occurring), then it takes overwhelmingly strong evidence (very high likelihoods) to yield an even modest posterior. In other words, it isn't impossible to have sufficient evidence to believe in miracles (or paranormal phenomena)—it just takes an extraordinary amount of it for that belief to become reasonable. Exactly how extraordinary can now be calculated by means of Bayes's theorem. ■

"Psychic Vibrations" has appeared in the SKEPTICAL INQUIRER for over thirty years. Sheaffer is also author of *UFO Sightings: The Evidence* (Prometheus Books, 1998). He blogs at www.BadUFO.com.

Commie Nazi Saucer Crashed at Roswell

According to a new book by Annie Jacobsen, *Area 51: An Uncensored History of America's Top Secret Military Base*, the saucer that crashed in Roswell, New Mexico, was not alien in origin but instead a collaboration between Stalin and ex-Nazi Josef Mengele to cause panic in the United States.

This absurd claim was presented in all seriousness by many of the major media, including the *Huffington Post*. On May 22, the *Albuquerque Journal* headlined "Stalin, Nazi Implicated in Roswell Incident." The story was also reported in the *Boston Globe*, AP News, and other publications. Practically the only news outlet to show any proper skepticism was Bloomberg's review of the book, "Roswell Martians Might Have Been Nazi Kids From Mengele's Lab."

No reporter worth his salt should ever have given credence to this preposterous claim, even for a minute. Anyone who did belongs in some other profession. There are so many things wrong with this claim that one hardly knows where to start. But I'll give it a try:

First, the first publicized sighting of a disc-shaped craft was by Kenneth Arnold on June 24, 1947. The Roswell incident occurred *ten days later*. Did Stalin and Mengele put this saucer hoax together in just ten days? That's laughable. (Interestingly, Arnold described the objects he saw as boomerang-shaped, but the press reported "flying saucers," so that's what people said they saw. See Martin Kottmeyer's "The Saucer Error," http://www.debunker.com/texts/SaucerError.html.)

Second, how did this thing fly? Its propulsion system would be immediately recognized by U.S. experts as conventional and terrestrial. Its electronics, years behind the best U.S. systems, would also

be immediately recognized as Soviet in origin. The idea that Stalin could fool U.S. experts into thinking that they were examining an extraterrestrial craft is simply absurd. Stalin was indeed devious and evil, but he was not stupid.

Third, the children who had allegedly been deformed by the cruel Mengele to look like extraterrestrials reportedly did not all die in the crash. Surely their Soviet handlers knew that if any of them survived, they would immediately be screaming for help in Russian or German, revealing the deception at once.

Fourth, this is an attempt to explain something that does not need explaining. Jacobsen's wild claim attempts to explain the origin of a disc-shaped craft containing alien-looking beings that allegedly crashed at Roswell. But there is no credible evidence whatsoever that this is what was actually found there, no matter what unsubstantiated tales might be told. The man who actually found the Roswell debris, Mac Brazel, described it as looking like a "large number of pieces of paper covered with a foil-like substance and pieced together with small sticks much like a kite"—in other words, like the debris of a balloon's radar reflector, probably from Project Mogul (see my book *UFO Sightings*, Chapter 4). There is no credible evidence that anything bigger than tinfoil and sticks was ever recovered at Roswell. It is not wise to invoke extraordinary explanations for ordinary phenomena. This is the fallacy of misplaced rationalism, in which the "rational" explanation is even more implausible than what it is supposed to explain (see my column, "The Fallacy of Misplaced Rationalism," SI, July/August 2008; reprinted in Kendrick Frazier's *Science Under Siege* [Prometheus Books, 2009]).

Fifth, we know that Mengele was hiding out in Bavaria under an assumed name from 1945 to 1949 and escaped to Argentina soon afterward. As anyone who has read Solzhenitsyn's *Gulag Archipelago* surely realizes, Stalin never gave anyone who might have information embarrassing to the Soviet Union a chance to tell it. For example, millions of returning Soviet prisoners of war were sent to the Gulag for the "crime" of having firsthand knowledge of the outside world. If Stalin had ever held Mengele, a wanted war criminal, he never would have let him escape. Stalin would have placed Mengele in the Gulag, probably in the "First Circle" (see Solzhenitsyn), where scientific and technical prisoners were held but compelled to work for the Soviet Union. Stalin lived until 1953, by which time Mengele had been in Argentina for several years. Thus the known facts of Mengele's life contradict this preposterous tale—at no time was he ever living in the Soviet Union or even in the Soviet-occupied sector of Germany.

The idea that Stalin could fool U.S. experts into thinking that they were examining an extraterrestrial craft is simply absurd. Stalin was indeed devious and evil, but he was not stupid.

* * * * *

And just when you think that the credibility of the mass media can't get any lower, they fall for *this* one: On April 10, the major media outlets proclaimed headlines like "Secret FBI memo 'proves' govt. covered up Roswell alien landing of 1947." The *International Business Times* explained, "A secret memo released online by the Federal Bureau of Investigations [*sic*] (FBI) in its 'Vault' has emerged as proof for the famed landing—or crash or capture—of a flying saucer with three dead aliens in Roswell in New Mexico in June 1947." The London *Daily Mail* reported on April 11, 2011: "Also among the files, released for the first time, is a memo from Guy Hottel, the special agent in charge of the Washington field office in 1950, which appears to prove that aliens landed at Roswell, New Mexico."

Except that the supposedly "just released" 1950 memo has been kicking around in UFOlogy circles at least since the early 1980s, and it has *nothing* to do with Roswell. Written by Washington, DC, FBI Agent Guy Hottel, the memo simply recounts a yarn he'd been told about a supposed saucer crash near Aztec, New Mexico. In my files I found a 1983 newspaper article showing MUFON's then-director, Walt Andrus, shamelessly trying to exploit the Hottel Memo and numerous other references to it during the 1980s.

Dave Thomas of New Mexicans for Science and Reason has produced a fine analysis telling the complete story of the Hottel memo's origin and of others' attempts to exploit it (www.nmsr.org/hottel.htm). Thomas traces the story's origin to

> the yarns spun by our two swindlers! [UFOlogist] William Moore even traced how the story got from Silas Newton to J. Edgar Hoover: Newton told George Koehler (employed at radio station KMYR in Denver), who told Morley Davies, who told Ford dealers Murphy and van Horn, who told auto dealer Fick, who told the editor of the Kansas City Wyandotte Echo. By that time, Koehler had become "Coulter," just like a game of "gossip" (or a game of "pi")!

For more information about the Silas Newton/Frank Scully "Aztec crash" hoax, see my webpage at www.debunker.com/Scully.html. On it, you will find a three-part MP3 recording of J.P. Cahn, who uncovered this "classic" hoax (Cahn exposed it in a notable book-length investigative article in the September 1952 *True* magazine), giving a talk to the Bay Area Skeptics in 1984. As far as I know, this is the only recording of Cahn discussing his research into the Scully crash hoax. Cahn was a very entertaining speaker (his voice was heard on a number of radio commercials), so you might enjoy hearing him tell the story in his own words.

The lesson of this whole fiasco: the next time you hear the major news media reporting some major development supposedly proving the reality of extraterrestrial UFOs, remember how they sensationalized the sixty-year-old, eighth-hand information in the Hottel FBI memo.

* * * * *

As just about everyone now knows, radio evangelist Harold Camping of Family Radio whipped his followers up into frenzy with his confident prediction that Judgment Day, and the Rapture, would begin on May 21, 2011. (I reported that prediction in this column way back in the May/June 2010 SKEPTICAL INQUIRER). This created big excitement and eventually became a huge news story. The fact that Camping had issued an equally confident prediction of Armageddon for September 1994 did not seem to count against him.

A few days after the world didn't end, Camping explained to his followers that the Second Coming of Christ *did* in fact occur on May 21, but it was a "spiritual coming." (This excuse has been used before when a predicted doomsday has failed to occur.) This began, he said, a five-month period leading up to the final judgment and destruction on October 21.

Camping's original prediction of Judgment Day and the Rapture on May 21 allowed the un-raptured to remain on earth until October 21, the date of their final destruction, so Camping is claiming that his original prediction is still on track. "It won't be spiritual on October 21st," said Camping. "The world is going to be destroyed all together, but it will be very quick." It remains to be seen how many of his followers will go into a frenzy over the scheduled October 21 doomsday. But just because Camping's May 21 Judgment Day was a bust, we're not home free yet. The world is still scheduled to end twice before the end of 2011, followed up by the Big Enchilada on December 21, 2012.

First, the world is ending (or at least getting very messed up) later in 2011, probably in September, when Comet Elenin (C/2010 X1) comes to perihelion (its closest approach to the Sun). This information (more accurately, misinformation) comes to us from one Laura Knight Jadczyk, who channels messages from the Cassiopeans. Superficially, this prediction is very similar to those by Nancy Lieder, who channels doomsday messages about Planet X from the Zetas. Jadczyk, however, emphasizes that Comet Elenin is not Planet X, and it is not going to collide with Earth. However, there is much talk about a "pole shift." The Cassiopeans explain that they are not, strictly speaking, extraterrestrials but are in some way our "future selves."

Elenin is a faint comet. It originally was visible in amateur telescopes only with difficulty, but it is expected to become visible in binoculars during the fall of 2011. Why is it of so much interest? Some conspiracy-oriented websites think that the media have been strangely silent about the comet. (As if the major media have ever trumpeted the arrival of faint comets that people cannot see.) For Jadczyk, it's important because the Cassiopeans told her that the outburst of 596 Scheila, an object believed to be an asteroid that began outgassing and revealed itself to be a comet, was related to Comet Elenin in some unspecified way. She also ties this in with James McCanney's Plasma Theory of comets and similar "electric universe" theories about comets being "electric."

Just as you don't find the term "creation science" any more, just "intelligent design," you also don't find "Velikovskian" theory—it's now the "electric universe." According to these latter-day Velikovskians, all comets are filled with electricity; when Comet Elenin reaches the inner solar system, it is supposedly going to zap all of the planets with big lightning bolts. Jadczyk thinks that the greatest danger to Earth will be on September 27 and November 23 of this year, even though the comet will never get closer than about twenty-one million miles from Earth. This is indeed closer than the Earth ever comes to Venus or Mars, but it is still about 100 times the distance between Earth and the Moon. According to a posting on UFO-Blogger.com (http://tinyurl.com/45xzrn9), "every time Elenin lines up with Earth and another planet or the sun we have an earthquake, the nearer Elenin gets the bigger the earthquakes." Of course, given that earthquakes of magnitude 6 or greater occur every three days on average, that one of the cited earthquakes was as small as 4.7 (several such earthquakes occur every day), and that an "alignment" seems to last as long as five days, it would be amazing if corresponding earthquakes could *not* be found.

In another kind of doomsday, our friends in "exopolitics" are warning that "Universal Law" will cause "the collapse of the world economy starting in 2011" (http://tinyurl.com/4ymnro9). There is also a group claiming that on December 24, 2011, hostile aliens will try to begin the extermination of the human race (www.greatdreams.com/end-world.htm) unless the good aliens are able to stop them. In case you're having trouble keeping all these doomsdays straight, the website at www.rowdydow.co.uk/eotw/ lists them all for you and will even send you an e-mail warning each time that the world is scheduled to come to an end. ■

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Selling Stem Cell Hype

The parents of a two-year-old girl who has been blind since birth raised nearly $50,000 to take her to a clinic in China, where she received stem cells from donated umbilical cords. After the treatment, the parents were convinced that her sight had improved, but objective examination by an ophthalmologist revealed that she still had no vision. It's a sad story that is one of many similar stories—the result of premature hype surrounding a relatively new technology.

Actually, stem cell therapies have been around for years, but only for very limited applications such as treating certain blood cancers. The debate surrounding the ethics of using embryonic stem cells, however, has highlighted the great potential of therapies based on stem cells.

Stem cells are undifferentiated cells that have the potential to turn into specific cell types. Embryonic stem cells are the most potent because they can theoretically turn into any cell type in the body. The hope of research into stem cells is that we can learn how to control the process of differentiation so that stem cells can be used therapeutically.

Potential applications that are already being researched include injection of stem cells into failing hearts—cells that will then turn into heart muscle cells and start beating along with the rest, strengthening the heart. While still experimental, this is likely to be an early application of this kind of use of stem cells. Similar experiments are underway using stem cells to repair damaged brains or spinal cords.

Stem cells share some characteristics with cancer cells, and injected stem cells are as likely to become cancers as replacements for diseased or injured cells.

Stem cells might also be used not as replacement cells but as support cells. Genetically engineered stem cells can essentially become drug delivery systems or support cells that allow diseased cells to survive longer and function better.

But many hurdles remain, the biggest of which is keeping stem cells from becoming cancer cells. There is a reason our bodies are not already infused with stem cells that have unlimited regenerative ability (our bodies do have natural stem cells, but they are in specific numbers and locations). Stem cells share some characteristics with cancer cells, and injected stem cells are as likely to become cancers as replacements for diseased or injured cells.

Getting stem cells to do what we want them to, and getting them to survive long enough to do it, is also no trivial matter. Stem cells have tremendous potential, and they will likely be playing an increasing role in medical therapies over the next twenty years. But reality has yet to catch up with the hype.

The situation is ripe for exploitation. Stem cell clinics have been set up, mostly in poorly regulated countries such as China, India, and several countries in South America. They exist to lure in wealthy (by international standards) Westerners desperate for a cure (such as the parents of young blind children). Fees range from the tens of thousands to even hundreds of thousands of dollars, including the costs of travel. Most victims are not wealthy people who simply write a check but instead members of middle-class families who need to raise money for the treatments.

Once they have invested so much time, effort, and emotion and so many resources in the stem cell treatment—which often includes taking money from family, friends, and coworkers—these families have a huge investment in believing the treatment has worked, even when all objective evidence says otherwise. Often there is a temporary placebo effect from getting the treatment—or perhaps a temporary effect from the anesthesia or other aspects of the treatment—but no real improvement. But any fluctuation in symptoms

is often interpreted as a sign the treatment has worked, which sometimes motivates the patients and their families to raise more money for more stem cell treatments.

The clinics themselves are not producing useful scientific data but are instead simply publicizing anecdotes of their success. There is often little transparency in what they are doing and no way of knowing what they are even injecting into their patients.

perate patients through their doors.

Hope is a very positive emotion; it can keep us going in hard times, and it motivates all the hard work and investment it takes to develop high-tech treatments such as stem cell therapy. But there is a dark side to hope: false hope, promoted by premature uncritical hype. Unjustified hype also undermines legitimate therapies and scientific research as the public becomes disillusioned. While it is legitimate to discuss the great potential of stem cell therapies, such discussions must include the proper context. Stem cell therapies remain largely experimental, and there is no telling when or even if they will pan out.

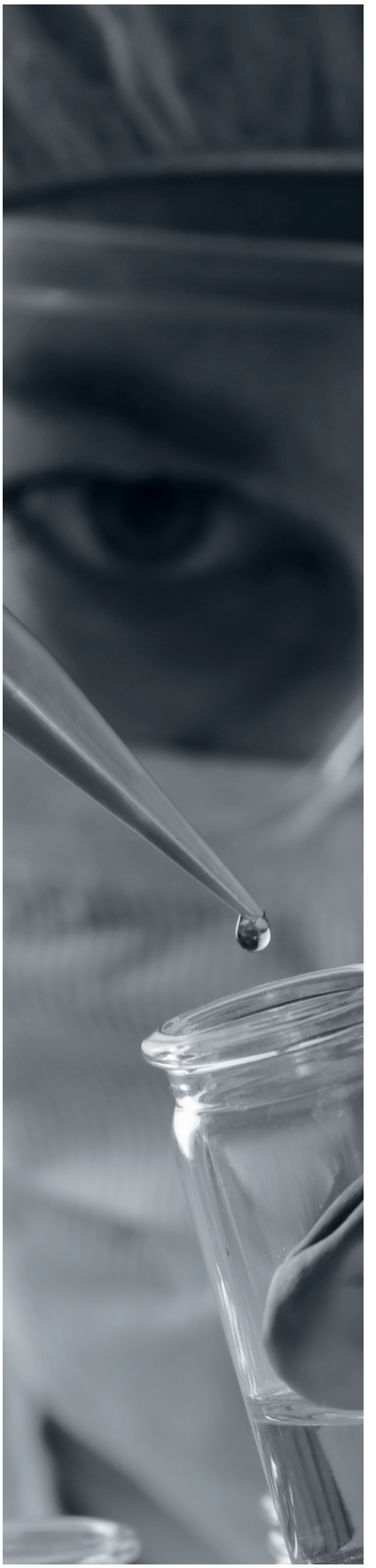
The media ... mostly promote these fraudulent stem cell clinics. They often report stories of "miracle cures" in gushing terms, without the slightest amount of skepticism.

What little objective investigation we have into these stem cell clinic treatments reveals that patients are either unchanged or even harmed by the therapies. Ophthalmologist Shakesh Kaushal, of the University of Massachusetts, examined eight children treated with stem cells for blindness. "There didn't seem to be any ostensible benefit from the stem-cell infusion," he is quoted as saying in an NPR report, "in all of them, as far as we could tell" (Knox 2010).

Dobkin et al. (2006) reviewed the cases of seven patients who received stem cell injections for spinal cord injury. They conclude, "No clinically useful sensorimotor, disability, or autonomic improvements were found." In other words, there was no benefit. There were, however, complications, including meningitis in five of the seven patients.

The media, for their part, mostly promote these fraudulent stem cell clinics. They often report stories of "miracle cures" in gushing terms, without the slightest amount of skepticism. These reports are little more than free advertisements for these clinics, driving more des-

The media need to take greater responsibility in relating these stories to the public. Medical professionals need to pay attention to what is happening, and they also need to get involved in properly informing the public. Governments need to pay close attention to how such clinics are regulated. And the public needs to approach claims of stem cell "miracles" with extreme skepticism and get advice from professionals before investing emotion and large amounts of resources into what is likely to be all hype and no hope. ■



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SKEPTICAL INQUIREE] BENJAMIN RADFORD

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Dowsing: Dubious, Discredited, and Dangerous

Q: What can you tell me about the "science" of dowsing?

—J. Gilliland

A: People through the centuries have revered and perpetuated practices despite the fact that they simply do not work. Dowsing is a textbook example of this. Part of the reason for dowsing's longevity is its versatility in the paranormal world. If we conceive of the paranormal as a tasty (but ultimately nourishment-free) meal, dowsing is a sort of all-purpose side dish. It can stand alone as a New Age endeavor when searching for water or missing jewelry, or it goes equally well with a variety of pseudoscientific main dishes, including ghost hunting, crop circles (Pringle 1999) and fortune-telling. Dowsing is said to find anything and everything, including missing persons, buried pipes, oil deposits, and even archaeological ruins (see "Dowsing and Archaeology: Is There Something Underneath?," SKEPTICAL INQUIRER, March/April 1999).

The dowsing with which most people are familiar is water dowsing (also known as water witching or rhabdomancy), in which a person holds a *Y*-shaped branch or two *L*-shaped wire rods and walks around until he or she feels a pull on the branch or the wire rods cross, which allegedly indicates that there is water below. Often a pendulum

A ghost hunter seeks spirits by dowsing at Canada's "haunted" Fort George. (Photo by Benjamin Radford)

is used, sometimes held over a map.

According to many books and experts, dowsing has a robust history, and its success has been known for centuries. For example, "In 1556, *De Re Metallica*, a book on metallurgy and mining written by George [*sic*] Agricola, discussed dowsing as an acceptable method of locating rich mineral sources" (Shaw 1995, 64). This widely cited reference is a rather transparent example of a logical fallacy called the *appeal to tradition* ("It must work because people have done it for centuries"). However, it seems that the dowsing advocates haven't actually read the book, which says exactly the opposite of what they claim: far from endorsing dowsing, Agricola states that those seeking minerals "should not make use of an enchanted twig, because if he is prudent and skilled in the natural signs, he understands that a forked stick is of no use to him . . . " (Hoover 2010).

If you assume that dowsing works—and that is of course a huge unproven assumption—how does it work? The proposed mechanisms are as varied as the dowsers themselves. One source states, "Dowsing is possible . . . through the strong psychic energy radiated by the object and picked up by the [dowser]" (Shaw 1995); another confidently states that "dowsing is not weird or spooky . . . it is as natural as memory. In fact, some scientists believe it may well be one of memory's forms . . . a vestigial memory of a survival method of searching, using senses other than the five obvious ones" (Evers 1977). James Randi (1995), in his *Encyclopedia of Claims, Frauds, and Hoaxes of the Occult and Supernatural*, notes that dowsers often cannot agree on even the basics of their profession: "Some instructions tell learners never to try dowsing with rubber footwear, while others insist that it helps immeasurably. Some practitioners say that when rods cross, that specifically indicates water; others say that water makes the rods diverge to 180 degrees."

If you assume that dowsing works—and that is of course a huge unproven assumption—how does it work? The proposed mechanisms are as varied as the dowsers themselves.

While I have participated in small-scale tests of water dowsing, I most often encounter dowsers during ghost investigations. Many amateur ghost hunters use dowsing rods to search for ghosts, believing that ghosts can be detected by (or communicate through) dowsing rods. In 2007, I demonstrated dowsing for the National Geographic Channel's *Is It Real?* television series on "Ghost Ships" in response to a woman who used dowsing rods on ghost hunts. Dowsers were also prevalent during a 2010 investigation into Canada's "most haunted" location, Fort George, Ontario (see photo).

Dowsers have been subjected to many tests over the years and have performed no better than chance under controlled conditions. There is no science behind dowsing, and though the main harm is wasted time and effort, it can also cost lives: in 2010, modified dowsing-rod devices claimed to detect bombs were sold to the Iraqi military (Radford 2010). ■

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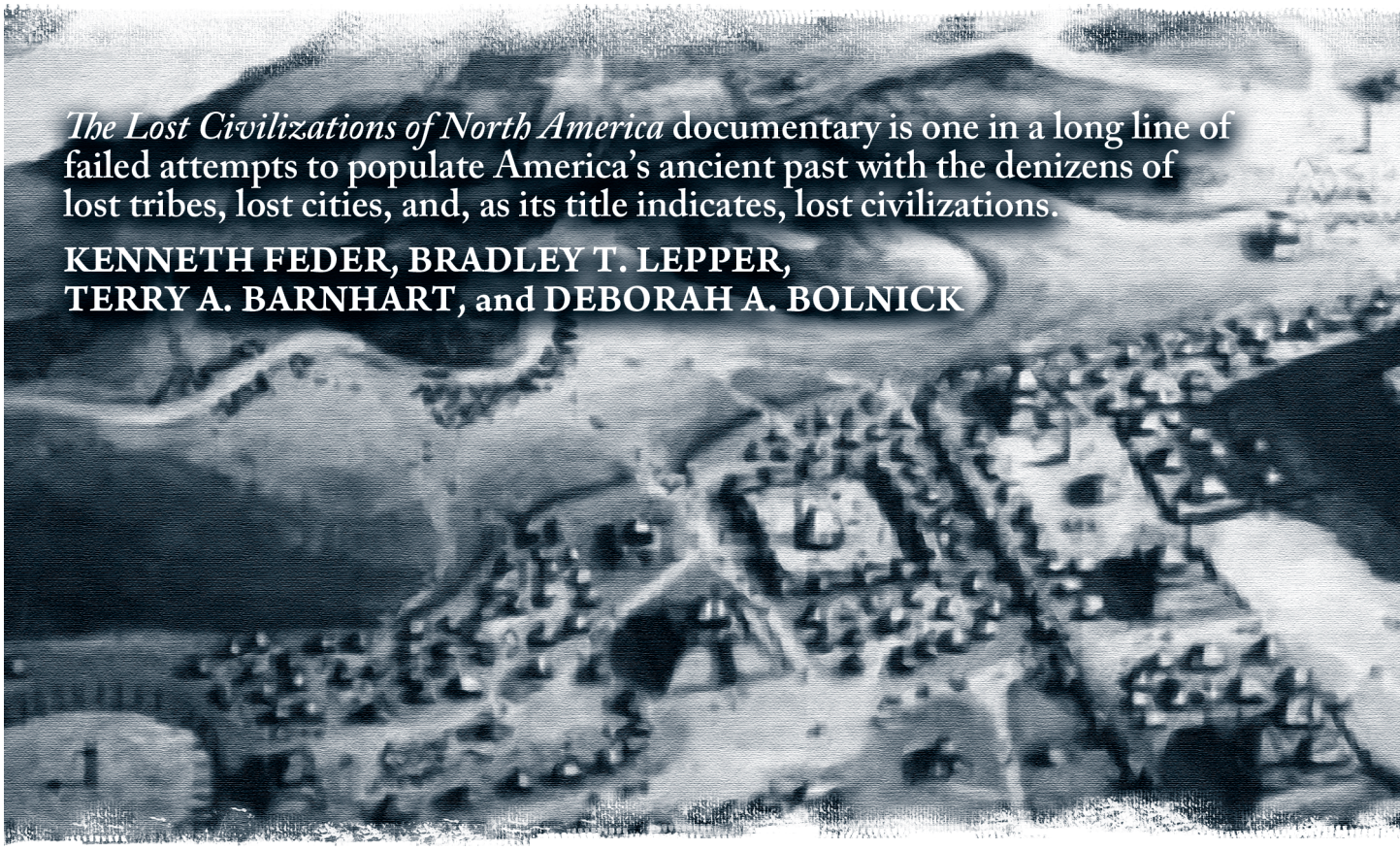
CIVILIZATIONS LOST AND FOUND



The Lost Civilizations of North America documentary is one in a long line of failed attempts to populate America's ancient past with the denizens of lost tribes, lost cities, and, as its title indicates, lost civilizations.

KENNETH FEDER, BRADLEY T. LEPPER, TERRY A. BARNHART, and DEBORAH A. BOLNICK

While there are many vernacular meanings of the term *civilization*, archaeologists tend to use it in a limited and precise way to signify a particular kind of society. For example, in his classic enumeration of the features that characterized humanity's earliest civilizations, prehistorian V. Gordon Childe (1951) included labor specialization, social stratification, production of a food surplus, construction of monumental edifices, urban settlements, and a consistent system of record keeping (usually, but not always, writing). More recently, Joseph Tainter (1988) added the development of a formal government apparatus to that list.

Civilizations Lost

To many at the fringes of the historical sciences, the term *civilization* takes on an entirely different, often coded, meaning—especially when a seemingly innocuous modifier, such as "lost," is applied to its front end. A vast amount of pseudoscience has been inspired by the simple phrase "lost civilization," particularly by those who believe that they have found its archaeological spoor and can thus recast the history of a particular people, an entire continent, or in the most extreme cases, all of humanity (Childress 1992; Hancock 1995, 2003; Haughton 2007). The history of Amer-

FABRICATING HISTORY
PART ONE: AN ALTERNATE REALITY

ican archaeology for the aboriginal cultures of North America is especially rife with problems relating to the indiscriminate and often confusing use of the phrase "lost civilization" and its cohorts "lost race," "lost city," and "lost tribe."

Many claims about the existence of a lost civilization in antiquity are, in effect, warmed-over versions of Plato's Atlantis myth: Long ago (commonly placed at more than ten thousand years before the present) and far away (on an island in the Atlantic or under the Antarctic ice cap or off the coast of Japan, etc.), an enormously advanced and technologically sophisticated civilization existed whose impact on human history was vast. In extreme versions of the lost civilization myth, the society in question possessed technologies that even modern people have not mastered. Alas, as the result of some terrible accident or war or natural catastrophe, that civilization was destroyed virtually overnight and thus became "lost." In such stories, conventional historians and archaeologists are described as being blind to the evidence for such a civilization or, in some cases, well aware of the evidence but part of a long-standing conspiracy to keep it all quiet, lest it upset the convenient apple cart of history concocted in their ivory towers.

In one subset of the lost-civilization genre of pseudohistory, the lost civilization is not a previously unknown group of people residing in the clichéd "dim mists of time" but instead an otherwise well-known ancient society that is remarkable primarily as a result of its geography, not for its precocious level of technological sophistication. Even restricting ourselves to just North America, the list of such claims is long—though evidence is short—and includes: Celtic kingdoms in the northeastern United States thousands of years ago (Fell 1976); Coptic Christian settlements in ancient Michigan (based on the so-called Michigan Relics) (Halsey 2009); Roman Jews in Arizona (the Tucson Artifacts) (Burgess 2009); the Lost Tribes of Israel in Ohio (the Newark Holy Stones) (Lepper and Gill 2000); and strange mixtures of various ancient Old World

peoples secreted in hideouts in the Grand Canyon in Arizona ("Explorations in Grand Canyon" 1909) and in a cave in southeastern Illinois (Burrows Cave) (Joltes 2003). These claims are predicated essentially on the same notion: ancient Europeans, Africans, or Asians came to the Americas long before Columbus and long—perhaps thousands of years—before the Norse; they settled here and had a huge impact on the native people but then somehow became lost, both to history and to historians. Today, a group of "independent scholars" (a euphemism often used to mean writers without institutional affiliation, formal training, or archaeological experience) trumpet the evidence for these ancient settlers of the Americas, disseminating their revisionist histories—not in refereed, professional journals but in popular books, magazines, and, perhaps most broadly, on websites and in cable TV documentaries.

The Lost Civilizations of North America

A recent iteration of this "alternative archaeology" (another euphemism, this one used for claims about antiquity lacking in credible scientific evidence) can be seen in the documentary *The Lost Civilizations of North America* (produced by Steven Smoot, Rick Stout, and Barry McLerran), described on its DVD packaging as "the compelling account of the wanton destruction of an ancient history." According to the video, this claimed "destruction" is both actual (in the sense of the physical, perhaps intentional, destruction of the archaeological evidence of this civilization) and metaphorical (in the sense of the intellectual denial of its existence). It is the embarrassing admission of the authors of this article that we naively agreed to participate in the program.

We do not agree with the vast majority of the interpretations of ancient American history presented in the documentary. While it is tempting to ignore the documentary as nonsense, the high production values coupled with the selective inclusion of academically credible scholars have resulted in its gaining international attention. Glenn Beck featured it prominently and favorably in the August 18, 2010, broadcast of his television program, and the website promoting the DVD claims it won the Best Multicultural Documentary Award at the 2010 International Cherokee Film Festival.

In a series of three articles, we will provide a scientific commentary on the interpretations expressed in this video concerning the ancient history of North America, using the documentary itself as emblematic of a far broader attempt to write an alternative history of the New World that is wholly unsupported by any archaeological or historical evidence. In this and two subsequent articles, we will address two questions that are particularly relevant: What is the evidence for the "lost" civilizations in North America? And how did this evidence come to be "lost"?

An Alternate Reality

Consensus among investigators in organized fields of knowledge is not a conspiracy to ignore, destroy, or sequester deviant or anomalous evidence, as is implied several times in the *Lost Civilizations* video. Consensus is based upon recognized rules of investigation and principles of interpretation that have been developed in relation to specific research problems. The emergence of consensus among anthropologists regarding the origin and antiquity of humankind in the New World is no exception.

The consensus view on this subject among archaeologists (together with geologists and biologists) is based on more than a century of excavating literally thousands of archaeological sites. A convergence of interdisciplinary data indicates that the New World was first populated at least thirteen thousand and perhaps as many as thirty thousand years ago by migrants from Asia (Meltzer 2009). These people entered the Americas via a wide expanse of land—called Beringia—connecting northeastern Asia with northwestern North America during periods of glacial expansion and concomitant lower sea levels (see figure 1). The first human migrants were few in number and entered a continent teeming with wildlife, including many now-extinct forms such as mastodons, wooly mammoths, giant ground sloths, and saber-toothed cats. Exploiting the richness of this "new world," the human pop-

Figure 1. This map shows the configuration of the modern coastlines of northeast Asia and northwest North America, along with the maximum Late Pleistocene extent of the Bering Land Bridge. Its existence, between thirty-five thousand and eleven thousand years ago, provided a broad avenue across which human beings first entered the New World from the Old.

Figure 2a. Miamisburg Mound, located in Miamisburg, Ohio, is one of the largest conical mounds in eastern North America. It is a burial mound built by the people that archaeologists have called the Adena culture, circa 800 BCE to 100 CE. (Ohio Historical Society) (K. Feder)

ulation grew quickly and expanded across the North and South American continents over a few thousand years. As settlers moved into new habitats and as the climate ameliorated at the end of the Pleistocene era (or "Ice Age") ten thousand years ago, descendants of those first settlers adapted to a great diversity of new and changing environmental conditions, producing an abundance of differing ways of life. Each group adjusted to the natural conditions with which it was faced. In some regions, extremely rich habitats and, ultimately, the development of agricultural subsistence systems allowed for the production of a substantial food surplus and led to the growth of stratified societies with many of the characteristics outlined by Childe and Tainter that define a civilization. Among these were societies of the American Midwest and Southeast—the so-called mound builders—whose ability to marshal the communal labors of large groups of people is clearly seen in an archaeological landscape of monumentally scaled earthworks that include conical burial mounds, truncated pyramids of earth called "platform mounds," effigy mounds (in the shape of various animals and birds), and vast areas enclosed by geometrically patterned earth embankments (Milner 2004) (figures 2a–2d).

It is the archaeological consensus that the myriad cultures seen in native North America, including the mound builders, for the most part developed independent of any external inspiration. Contact almost certainly occurred between ancient societies in North America and the civilizations to the south—there is evidence, for example, of turquoise trade between the native people of the American Southwest and the cultures of Mesoamerica (Powell 2005), and maize, a Mexican domesticate, eventually made its way northward into essentially all regions of the continent in which it could be grown. But there is no credible scientific evidence for the wholesale movement of people from the Old World into sub-arctic North America after the initial incursion from northeast Asia at the end of the Ice Age. Furthermore, there is no scientific evidence whatsoever that the cultural developments exhibited in the archaeological record here—like the monumentally scaled earthworks shown in figures 2a–2d—were in any way inspired by visitors or migrants from Africa, Europe, or Asia (Fritze 2009).

Native Americans were fully capable of developing complex and sophisticated cultures on their own without help from other societies. The archaeological record of North America clearly shows the indigenous development of the technologies, art, architecture, social systems, subsistence practices, and engineering accomplishments seen in native America. There is no archaeological or biological evidence for the presence of interlopers, and there is no need for their presence in explaining the archaeology of native America.

THERE IS NO CREDIBLE SCIENTIFIC EVIDENCE FOR THE WHOLESALE MOVEMENT OF PEOPLE FROM THE OLD WORLD INTO SUB–ARCTIC NORTH AMERICA AFTER THE INITIAL INCURSION FROM NORTHEAST ASIA AT THE END OF THE ICE AGE.

The producers of the *Lost Civilizations* documentary clearly do not subscribe to this "mainstream" interpretation of American archaeology. Instead, what seems to emerge is the following less-coherent "diffusionist" alternative history:

> Sometime toward the end of the last Ice Age, a few Asians stumbled into

Figure 2b. The Fort Ancient Earthworks are a series of earthen embankments that extend for more than three and a half miles around a high bluff along the Little Miami River in southwestern Ohio. The earthworks were built by the Hopewell culture, circa 100 BCE–400 CE. (CERHAS, University of Cincinnati)

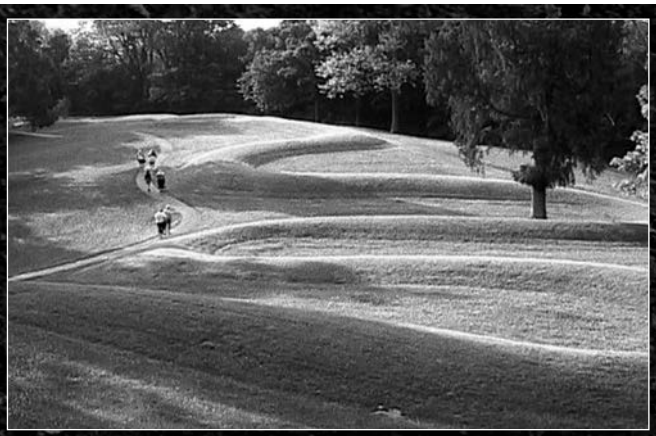


Figure 2c. Serpent Mound is the largest serpent effigy in the world. Located in Adams County, Ohio, it is thought to have been built by the Fort Ancient culture, circa 1000–1650 CE. (Center for the Electronic Reconstruction of Historical and Archaeological Sites [CERHAS], University of Cincinnati)

the New World across the Beringian land bridge. They developed indigenous societies, some of which may have been the beneficiaries of various unspecified contacts from the Old World over the millennia. By two thousand years ago, descendants of the original settlers living in eastern North America were building modest earthworks and scratching out a living by growing a few varieties of local plants. Then, a contingent of Israelites from the hills of Galilee arrived somewhere on America's east coast, spreading through the indigenous cultures, acting like missionaries and igniting the cultural florescence of the mound-building cultures we know today as the Hopewell (as well as the subsequent Mississippian). These new migrants brought with them their religion (Judaism, apparently) and their written language (Hebrew), which appears in some regions as inscriptions on stone tablets or other artifacts of special significance. They also inspired the construction of vast cities across the Midwest and Southeast, raising up the locals to a high level of civilization, changing fundamentally and forever the cultures and histories of the previously benighted indigenous people.

In stark contrast to the elegant consensus achieved by the interdisciplinary work of archaeologists, geologists, geneticists, and linguists (Meltzer 2009; Goebel et al. 2008), recent issues of the diffusionist *Ancient American* magazine amply demonstrate that there is, in fact, no consensus among diffusionist researchers concerning which African, Asian, or European cultures arrived in America to serve as the elevators of Native American savagery, when they arrived, or which cultural achievements they are supposed to have introduced or inspired.

A Hidden History?

In support of the claim that there is a hidden history of ancient America, the documentary narrator asks a number of leading questions, such as: "Most Americans have no idea that ancient cities with advanced architectures once dotted the ancient North American landscape. . . . Why is it that top historians didn't know about such things and why is it that they are not generally known among the modern public either?"

Here the documentarians use an unsupported assertion (top historians don't know about the ancient mound-building societies of North America) to imply a scenario suggested throughout the rest of the documentary: that there has been some kind of conspiracy to keep the true history of North America quiet—so much so that even "top historians" don't know about it. In setting up this assertion, the producers interviewed Roger Kennedy, who served as the director of the Smithsonian's National Museum of American History from 1979–1992 and director of the National Park Service between 1993 and 1997. Kennedy admits that even into the early 1990s he was personally unaware of the fact that "massive city remains existed in North America."

It is a curious statement given the state of archaeological knowledge in the early 1990s. It is possible that Kennedy either did not understand the question or misunderstood its specific context. But it does not follow from such a candid and honest personal admission by a single historian that, as a group, archaeologists and historians were similarly uninformed and that these recognized leaders in the scientific community are therefore the victims (or perhaps the perpetrators) of a conspiracy of silence. It is problematic that the producers based a conclusion on what was effectively a sample size of one before asking the leading question: "Why is it that top historians didn't know about such things?" Was this really generally true in the early 1990s? Is it true today? In fact, it was not then, and it is not now. To better answer such a question, one might simply have skimmed through the *Guide to Departments of Anthropology* (published by the American Anthropological Association, a professional organization) for an answer. From that guide one would have determined that there are literally hundreds of archaeologists who have devoted their careers to the study of the mound-builder cultures and dozens of university programs that focus on them.

That many (likely, most) Americans don't know much of anything about the mound builders is unfortunately true, but this ignorance is part of a larger issue. Most Americans don't know much of anything about Native American cultures, which is of course a shame. But it is an enormous jump to

Figure 2d. Monks Mound, at Cahokia in Illinois, is by volume the fifth largest pyramidal monument in the world. Ultimately more than one hundred feet high, Monks Mound was constructed and maintained between 900 and 1300 CE. It served as the elevated platform on which stood the home of Cahokia's ruler. Cahokia was, effectively, the capital of a powerful, indigenous political and economic entity. (K. Feder)

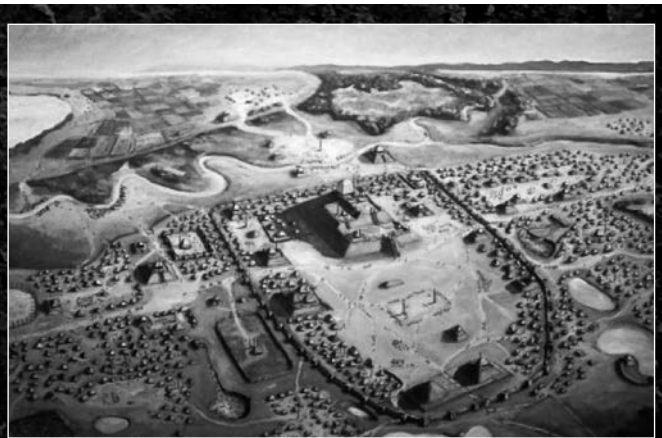


Figure 3. Artist's conception of Cahokia at its peak, focused on the elite precinct of the community. Archaeological evidence indicates the presence of an extensive palisade consisting of an estimated twenty thousand logs isolating an elite compound of a city of as many as ten thousand inhabitants. (Courtesy of Cahokia Mounds State Historic Site. William R. Iseminger, artist. Reproduced with permission.)

imply from this sad reality that there is any kind of a conspiracy of silence about the sophistication of ancient American mound-building societies.

In fact, just the opposite is true. Professional archaeologists in universities and museums have made a concerted effort to get the word out about the mound builders. Archaeologists have written a series of popularly oriented books about mound societies, for example: Milner (2004); Lepper (2005); Pauketat (2009); and Iseminger (2010). Glossy magazines with a broad popular readership have published extensively on the mound-building societies. The magazine of the National Museum of the American Indian (a publication of the Smithsonian Institution) featured an article about Cahokia, the largest of the mound-builder sites, in its Winter 2010 issue (Adams 2010). As we were preparing this article in January 2011, *National Geographic* magazine published a major piece about that same site (Hodges 2011). It certainly is not the first time the mound builders have been highlighted in *National Geographic*. Also, over the past few decades there have been numerous articles about the mound-building cultures in *Archaeology*, the magazine published by the Archaeological Institute of America, aimed at a mixed professional and popular audience (see, for example, Iseminger 1996 and Lepper 1995), as well as in *American Archaeology*, published by the Archaeological Conservancy.

There are dozens of websites, many produced by universities along with the federal and state governments, dedicated to the mound builders in general and specific sites in particular. Typing "mound builders" into a Google search box returns nearly four hundred thousand hits! It's not for lack of trying on the part of archaeologists and historians that most Americans are ignorant of the mound builders. To imply a conspiracy to keep the public unaware of them is to ignore the facts.

Secret Cities of Ancient America?

Beyond the factually incorrect conclusion that even at the end of the twentieth century historians were ignorant of the mound-building native societies of the American Midwest, there are additional problems with the Kennedy interview. The first results from an imprecision in terminology, specifically *settlement* and *city*. In fact, there is no archaeological evidence of widespread "massive city remains" in North America by any formal definition of the term *city*. With the possible exception of Cahokia, there are no archaeological settlements in North America that are comparable in size and population density to, for example, the earliest city-states in Mesopotamia, the first cities located along the Indus River in Pakistan, or any of the large urban settlements located in the Valley of Mexico. Even estimates for Cahokia rarely calculate its population at more than ten thousand people, a number sometimes used as a statistical cutoff point for the designation of a settlement as a city (see figure 3).

Other than Cahokia, all of the other large mound sites in North America appear to have been a different kind of settlement entirely: not cities but rather ceremonial centers with relatively small residential populations surrounded by numerous hamlets dispersed in vast areas around them. The people living in these hamlets produced the surplus (in the form of food, wealth, and labor) that supported the ritual elites living in the mound centers. In a particularly egregious example of misuse of terminology, the documentary describes the earth embankment that encloses the Newark Earthworks in Ohio as "city walls." This is nonsense. The Newark Earthworks include a spectacular array of more than four and a half square miles of geometric enclosures and mounds in a variety of shapes and sizes, but there is no archaeological evidence for an urban population here (Lepper 2004) or at any of the other monumental earthworks of the Hopewell culture (figure 4).

To be clear: stating that places like the Newark Earthworks, Poverty Point in Louisiana (Gibson 2000), Etowah in Georgia, Moundville in Alabama (Welch 1991), Town Creek Mound in North Carolina, or Crystal River Mounds in Florida were not cities is not to disparage them or minimize the achievements of those who produced them. It merely points out the fact, as shown clearly by archaeological investigation, that this architecture was not urban in character and was wholly unlike cities as ordinarily defined. Indeed, one of the fascinating challenges posed by such structures is how a population dispersed in small hamlets without hereditary kings or pharaohs could have organized the labor to erect such massive earthworks.

IT'S NOT FOR LACK OF TRYING ON THE PART OF ARCHAEOLOGISTS AND HISTORIANS THAT MOST AMERICANS ARE IGNORANT OF THE MOUND BUILDERS. TO IMPLY A CONSPIRACY TO KEEP THE PUBLIC UNAWARE OF THEM IS TO IGNORE THE FACTS.

About such sites, the documentary asks: "The real question is, why were these sites not preserved? And why are these advanced civilizations not commonly known of today?" To answer these questions about the perceived lack of preservation of sites from an ancient "lost civilization" in North America, the documentary points to the doctrine of Manifest Destiny and the theory of evolution. It is asserted in the documentary that it was crucial for many Americans in the eighteenth and nineteenth centuries to denigrate the cultural evolutionary status of the native

residents. By either destroying or ignoring archaeological evidence of a sophisticated North American civilization, the film's producers maintain, settlers were clearing their consciences about dispossessing native peoples of their lands.

This in itself is hardly a revelation. Manifest Destiny, the belief that the American republic was destined to colonize the trans-Mississippian West, was a largely unexamined assumption that affected scientific attitudes toward Native Americans and profoundly shaped federal Indian policy from the 1840s through the end of the nineteenth century (Horsman 1981). That the mounds were viewed as problematic to those who perceived Native American culture as fundamentally primitive and destined for extinction is an underlying theme of Robert Silverberg's classic work, *Mound Builders of Ancient America* (1968). It is a point likewise made in the mound chapter of Kenneth Feder's *Frauds, Myths, and Mysteries: Science and Pseudoscience in Archaeology* (2011). So, any notion that the documentary has exposed a conspiracy here is nonsense. And it should be further noted that roughly half of the documentary is devoted to asserting that Native Americans were historically denied civilized status by destruction of their mounds, and the other half is devoted to asserting that the mounds were actually built by interlopers from the Middle East. That unsupported claim denies the cultural achievements and heritage of the mound-building peoples just as surely as did those in the nineteenth century who argued that the ancestors of prehistoric North American Indians had not built the mounds.

Figure 4. The Octagon Earthworks are one part of the much larger Newark Earthworks located in Newark, Ohio. The elaborate monumental earthworks, built by the Hopewell culture circa 100 BCE–400 CE, incorporate a sophisticated knowledge of geometry and astronomy in their form and alignments. The first of the Newark "holy stones" was found just east of the octagonal enclosure. (Tim Black and/or Greater Licking County Convention and Visitors Bureau)

Implicit in the narrator's statement that "whether intentional or not, whether motivated by religious or political agendas or not, modern experts agree that wanton destruction did occur" is the suggestion that the mound sites may have been singled out for deliberate destruction to eliminate evidence of an ancient native civilization in North America. This takes great liberty with history. There were those in the nineteenth century who believed they had a duty to both the past and the future to survey and minutely describe prehistoric sites while it was still possible to do so. They were regrettably a minority, but far from an insignificant one. Many of the survey maps used in the *Lost Civilizations* video, in fact, were the fruit of those historically conscious antiquaries of the nineteenth century (Barnhart 1998, 2005).

While the documentary focuses on the "wanton destruction" of prehistoric mounds and geometric enclosures, it largely glosses over the fact that there has been a concerted effort to preserve some of the most impressive of these sites for archaeological research and public education. Many mound sites are open to the public, and many have on-site museums where the public can learn the story of the site's inhabitants in some depth. One recent compilation lists no fewer than seventy mound and earthwork sites in the states of Indiana, Kentucky, Ohio, and West Virginia that are preserved and accessible to the public (Woodward and McDonald 2002). Among the more prominent are Hopewell Culture National Historic Park, Serpent Mound, the Newark Earth-

works, and Fort Ancient Earthworks (see figures 2b, 2c, and 4). These sites, along with Poverty Point National Monument, recently have been placed on a short list by the U.S. Department of the Interior to be nominated for the United Nations Educational, Scientific and Cultural Organization's World Heritage List. Cahokia Mounds in Illinois is already one of the few prehistoric sites in the United States on the World Heritage List. Furthermore, recent figures from Hopewell Culture National Historic Park in Ohio show that between thirty and forty thousand people visit this mound site each year. Also in Ohio, more than twenty thousand people visited Serpent Mound in 2010. Cahokia reports an attendance of approximately 320,000 people annually. If there is a conspiracy within the "mainstream" scientific community to keep the mound cultures a secret, we haven't been doing a very good job of it. The implication that such sites have been systematically and intentionally destroyed or kept hidden for the nefarious goal of concealing the truth about Native American societies is self-evidently ludicrous.

Beyond attempting to prove a nonexistent conspiracy to hide the mound-builder cultures from the public, the *Lost Civilizations* documentary presents what is to be interpreted as evidence of the movement of Old World people, specifically migrants from the ancient Middle East, to the New World. It then outlines the enormous impact these interlopers had on the already in-place indigenous societies. The bulk of this "evidence" consists of artifacts bearing written messages in Old World languages, especially Hebrew, and DNA that, it is claimed, proves a connection between the Hopewell mound builders of Ohio and ancient people from Israel. We will deal with these two sets of evidence in the second and third articles in this series, respectively. ■

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DISCLAIMER

We are well aware that a claim underlying the *Lost Civilizations* documentary—that the mound-building people of the American Midwest were migrants from the Middle East 2,000 years ago—may be informed by religious doctrine. It is our position in this paper, however, that whatever inspires this claim is not nearly as important as the fact that it is plainly wrong. As such, we will leave it to others to assess the role played, if any, by religion in shaping *Lost Civilizations* and focus instead on scientific evidence relevant to that claim.

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The Haunted Brain

Reports of alleged ghostly activity tell us a great deal about the innermost workings of our brains.

RICHARD WISEMAN

There is an old joke about a university lecturer who asks his class, "Has anyone here ever seen a ghost?" Fifteen students put their hands in the air. Next, the lecturer says, "Well, who here has touched a ghost?" This time only five hands go up. Curious, the lecturer adds, "OK, has anyone actually kissed a ghost?" A young man sitting in the middle of the lecture theater slowly raises his hand, looks around nervously, and then asks, "I'm sorry, did you say 'ghost' or 'goat?'"

Thankfully, the results from national surveys have yielded more clear-cut findings. Opinion polls have consistently shown that around 30 percent of people believe in ghosts, and about 15 percent claim to have actually had a ghostly experience (Musella 2005). James Houran has carried out a great deal of research into the nature of these ghostly experiences. Houran is an interesting fellow. During the day this mild-mannered statistician works for a well-known Internet dating site creating mathematical models that help promote compatibility. By night Houran transforms into a real-life ghost buster, conducting surveys and studies that aim to solve the mystery of hauntings. Fifteen years ago, he analyzed almost a thousand ghostly experiences to discover what people report when they believe that they have encountered a spirit (Lange et al. 1996).

Houran's work revealed that reports of full-fledged apparitions are very rare. In fact, they account for only 1 percent or so of sightings; when such figures do turn up, they usually appear at the foot of a bed as people are either waking up or drifting off to sleep. Around a third of Houran's reports involve rather fleeting visual phenomena, such as quick flashes of light, odd wisps of smoke, or dark shadows that move furtively around the room. Another third involve strange sounds, such as footsteps from an empty room or ghostly whispering. The remaining third are a mixture of miscellaneous sensations, including odd odors of flowers or cigar smoke, sensing a ghostly presence, or feeling a cold shiver down one's spine.

For well over a century, scientists have attempted to explain these strange experiences. Like much of the research into alleged paranormal phenomena, their work tells us a great deal about our brains, beliefs, and behavior.

The Rose without a Thorn

London's Hampton Court Palace has been home to some of Britain's most famous kings and queens. Nowadays the palace is a popular historical attraction, playing host to more than half a million visitors each year.

The palace is famous for many things: It houses invaluable works of art from the Royal Collection, contains the best-preserved medieval hall in Britain, and boasts a giant Tudor kitchen. It is also considered one of the most haunted buildings in Britain. Various spirits allegedly haunt the palace. There is a "lady in gray" whose walks through the cobbled courtyards are as regular as clockwork, a "woman in blue" who continuously searches for her lost child, and a phantom dog that lives in Wolsey's closet. However, despite stiff competition, Hampton Court's most famous spirit is that of Catherine Howard.

Henry VIII ruled Britain during the first half of the sixteenth century, but he did not have a great track record when it came to relationships. He cheated on his first wife, beheaded his second, lost his third while she was giving birth to his only son, and divorced his fourth. In a move that would make even the most experienced marriage counselor raise an eyebrow, the forty-nine-year-old Henry then became infatuated with a nineteen-year-old courtier named Catherine Howard. After a brief period of wooing, Henry married Howard, publicly declaring that she was his "rose without a thorn."

A few months after getting married, Catherine found herself very much in love. Unfortunately, the apple of her eye was not her husband, Henry, but rather a young courtier named Thomas Culpepper. News of their affair eventually reached Henry, who promptly decided to fetch the garden shears and remove

the head of his beloved rose. Upon hearing the bad news, Catherine was understandably upset. She ran to Henry to plead for her life but was stopped by Royal guards and dragged back through the corridors of the palace to her apartments. A few months later both Thomas Culpepper and Catherine Howard were beheaded at the Tower of London.

The ghost of Catherine Howard is said to haunt the corridor down which she was dragged against her will. By the turn of the last century this area of the palace had become associated with a whole host of ghostly experiences, including sightings of a "woman in white" and reports of inexplicable screams.

In January 2001, a palace official telephoned me, explained that there had been a recent surge in Catherine-Howard-related phenomena, and wondered whether I might be interested in investigating. Eager to use the opportunity to discover more about hauntings, I quickly put together an experiment, assembled a research team, photocopied hundreds of blank questionnaires, loaded up my car, and headed off to the palace for a five-day investigation (Wiseman et al. 2002, 2003).

The palace had called a press conference to announce the start of my study, attracting the attention of journalists from all around the world. We decided to make the press conference a two-part affair, with a palace official talking about the history of the haunting in the first half, a brief break, and then my good self describing the forthcoming investigation. A palace historian kicked off the proceedings by telling a packed room of reporters what happened when Henry met Cathy.

During the brief break, I stepped outside to get some fresh air. The strangest thing happened: A car containing two tipsy teenagers drove slowly past me. One of the teenagers rolled down the window and threw an egg at me. The egg smashed on my shirt. Unable to change, I tried to remove the worst of the stains and then returned to the press conference. A few minutes into my talk, one of the journalists noticed the marks on my shirt and, assuming that it was ectoplasm, asked whether Catherine Howard had already slimed me. I replied, "Yes. This is going to be a tougher investigation than I first thought." Although said in jest, my comment was to prove prophetic.

Prior to the experiment, I had asked the palace to supply me with a floor plan of the corridor that would have held such unpleasant memories for Catherine Howard. I then met with Ian Franklin, a palace warder who had carefully catalogued a century of reports of unusual phenomena experienced by staff and visitors, whom I asked to secretly place crosses on the floor plan to indicate where people had consistently reported their experiences. To avoid any possible bias during the investigation, neither I nor any other member of the research team knew which areas had been marked by Franklin.

During the day, groups of visitors were transformed into ghost hunters. After hearing a brief talk about the project, each participant was handed a blank floor plan and asked to wander along the corridor and place an "X" on the floor plan to indicate the location of any unusual experiences that they might have (essentially playing a game of "spot the ghoul"). Each night we would place a variety of sensors and a £60,000 ($100,300) heat imager in the corridor in the hope of catching Catherine mid-"boo!"

Day one of the investigation went badly, with several participants wandering into the wrong corridor and then wondering why the floor plan was so wildly inaccurate. On day two, we were joined by a woman who claimed to be the reincarnation of Catherine Howard and said that she could provide a unique first-person perspective on the proceedings ("Actually, I was dragged up the corridor, not down it"; "Not sure that the new paint job in the kitchens works for me," etc.). Day four turned out to be especially interesting. The team (which now included the reincarnated Catherine Howard) assembled in the morning as usual and reviewed the heat sensor data from the previous night. It was immediately obvious that something very strange had taken place, with the graphs showing a massive spike in temperature around 6 AM. We eagerly rewound the recording from the thermal imager to discover whether we had caught Catherine on tape. At dead-on 6 AM the doors at one end of the corridor burst open, and in walked a figure. The reincarnated Catherine Howard instantly recognized the figure as a member of Henry VIII's court. However, a few seconds later the proceedings took a decidedly more skeptical turn when we saw the figure walk over to a cupboard, remove a vacuum cleaner, and

start to clean the carpets. Thankfully, the data from the rest of the investigation proved more revealing.

People who believed in ghosts experienced significantly more strange sensations than the skeptics. Interestingly, we have obtained the same pattern of findings in several investigations at other supposedly haunted locations. Time and again those who believe in the paranormal experience more ghosts than those who don't. As I loaded my equipment back into my car and said goodbye to our well-meaning but intensely annoying Catherine Howard wannabe, one question nagged away in my mind: Why?

The Machine in the Ghost

Neuropsychologist Michael Persinger, of Laurentian University in Canada, believes that ghostly experiences are caused by the brain malfunctioning and, more controversially, that these sensations can be easily elicited by applying very weak magnetic fields to the outside of the skull (Cook and Persinger 1997, 2001).

In a typical Persinger study, participants are led into a laboratory and asked to sit in a comfortable chair. They then have a helmet placed on their heads, are blindfolded, and are asked to relax for about forty minutes. During this time several solenoids hidden in the helmet generate extremely weak magnetic fields around the participant. Sometimes these fields are focused over the right side of the head; at other times they switch to the left, and once in a while they circle around the skull. Finally the helmet and blindfold are removed, and the participant is asked to complete a questionnaire indicating whether he or she experienced any strange sensations, such as the sense of a presence, vivid images, odd smells, being sexually aroused, or coming face-to-face with God.

After years of experimentation, Persinger claims that around 80 percent of participants tick the "yes" box to at least one of these experiences, with some even going for the "all of the above" option. The study has been featured in many science documentaries, resulting in several presenters and journalists putting Persinger's magic helmet on their heads in the hope of meeting their maker. For the most part, they have not been disappointed. Psychologist Susan Blackmore, for example, felt as if something had gotten hold of her leg and dragged it up the wall, followed by a sudden sense of intense anger (which is exactly how I would feel if someone took my leg and dragged it up a wall).

The idea of electromagnetic spirits has caught the imagination of the media and public alike. However, the scientific jury is unconvinced. So has anyone solved the mystery of hauntings?

All was going well with Persinger's theory until a team of Swedish psychologists, led by Pehr Granqvist from Uppsala University, decided to carry out the same type of experiments (Granqvist et al. 2005; Larsson et al. 2005). (For additional information about this work, see www.nature.com/news/2004/041206/full/news041206-10.html.)

It all started well, with some of the Swedes visiting Persinger's laboratory and even borrowing a portable version of one of his helmets for their own study. However, Granqvist became worried that some of Persinger's participants may have known what was expected of them, and their experiences could therefore have been due to suggestion rather than the subtle magnetic fields. To rule out this possibility in his own work, Granqvist had all of his participants wear Persinger's borrowed helmet but ensured that the coils were turned on for only half of the participants. Neither the participants nor the experimenters knew when the magnetic fields were on and when they were off.

The results were remarkable. Granqvist discovered that the magnetic fields had absolutely no effect. Three of his participants reported intense spiritual experiences, but two of these were not being exposed to the magnetic fields at the time. Likewise, twenty-two people reported more subtle experiences, but the coils were turned off for eleven of them. When Granqvist's work was published in 2004, Persinger argued that the poor showing may have been due, in part, to the fact that the participants who had their helmet coils turned on were exposed to the magnetic fields for only fifteen minutes and to the fact that Granqvist ran the DOS-based software controlling the coils in Windows and thus possibly altered the nature of the magnetic fields. The Swedish team defended their work and stood by their findings.

The idea of electromagnetic spirits has caught the imagination of the media and public alike. However, the scientific jury is unconvinced. So has anyone solved the mystery of hauntings? Before we delve deeper, it is time to discover more about the power of suggestion.

The Subtle Hint of Silage

In the late 1970s, sensory scientist Michael O'Mahony from the University of California took the power of suggestion to new heights when he persuaded the BBC to undertake an ingenious version of his well known sensory study during a live program (O'Mahony 1978). O'Mahony constructed some mock scientific apparatus (think a large weird-looking cone, masses of wires, and several oscilloscopes) and managed to keep a straight face as he told viewers that this newly devised "taste trap" used "Raman Spec-

troscopy" to transmit smells via sound. He then proudly announced that the stimulus would be a country smell. Unfortunately, the studio audience interpreted his comments to mean the smell of manure, resulting in a significant amount of laughter. After clarifying that they would not be broadcasting the smell of cow shit into people's homes, the research team played a standard Dolby tuning tone for ten seconds. Just as the bottles in the more pedestrian versions of O'Mahony's study contained nothing but water, so the tone did not actually have the ability to induce smells.

Viewers were then asked to contact the television station and describe their experiences. A few hundred viewers responded, with the majority stating that they had detected a strong smell of hay, grass, or flowers. Although they were explicitly told that the smell would not be manure-related, several people mentioned that they had detected the subtle hint of silage. Many respondents described how the tone had brought about more dramatic symptoms, including hay fever attacks, sudden bouts of sneezing, and dizziness.

The "Raman Spectroscopy" was simply scientific mumbo-jumbo. In reality the experimenters were exploring how the power of suggestion can cause people to experience various smells. James Houran (of Internet dating and ghost-busting fame) also believes that suggestion may play a vital role in unlocking the mystery of hauntings.

Houran speculated that if suggestible people believe that they are in a haunted house, they may experience the strange sensations typically attributed to ghostly activity. In addition, he noted that those experiences are likely to create a feeling of fear that will cause people to become hyper-vigilant and pay attention to the subtlest of signals (Lange and Houran 1999). They will suddenly notice that tiny creak in the floorboards, the swaying of the curtains, or a brief whiff of burning. All of this will cause them to become even more afraid and therefore exhibit even greater hyper-vigilance. The process feeds on itself until the person starts to become highly agitated, anxious, and prone to more extreme sensations and hallucinations.

Findings from many studies support Houran's ideas. In my own work, those who believed in ghosts reported far more weird experiences than skeptics, and their sensations tended to focus on the type of scary-looking locations that are frequently featured in horror films. Although these findings are encouraging, the ultimate testing of the theory involves taking suggestible people to a place that does not have a reputation for being haunted, making them believe that it does, and seeing if they experience the same kind of ghostly activity reported in "genuine" hauntings. Houran has conducted several of these experiments with intriguing results.

In one experiment he took over a disused theater that had absolutely no reputation for being haunted and asked two groups of people to walk around it and report how they felt (Lange and Houran 1997). Houran told one group that the theater was associated with ghostly activity and the other that the building was simply undergoing renovation. Those in the "this building is haunted" group reported all sorts of weird sensations, while the other group experienced nothing unusual. In another study, Houran asked a married couple living in a house that had no reputation for ghostly activity to spend a month making note of any "unusual occurrences" that they noticed in their home (Houran and Lange 1996). Reporting the results in the paper "Diary of Events in a Thoroughly Unhaunted House," he noted that the couple reported an amazing twenty-two weird events, including the inexplicable malfunctioning of their telephone, their name being muttered by a ghostly presence, and the strange movement of a souvenir voodoo mask along a shelf.

Hauntings do not require genuine ghosts, underground streams, low frequency sound waves, or weak magnetic fields. Instead, all it takes is the power of suggestion.

Hauntings do not require genuine ghosts, underground streams, low frequency sound waves, or weak magnetic fields. Instead, all it takes is the power of suggestion.

Ghosts, Gods, and Goblins

Although the psychology of suggestion accounts for many ghostly phenomena, there still exists one final mystery—why on earth should our sophisticated brains have evolved to detect nonexistent ghostly entities?

Scientists have proposed various theories to account for what goes bump in our minds. Psychologist Jesse Bering (2006) from the University of Arkansas has suggested that both ghosts and God help forge a more honest society by convincing people that they are constantly being watched. Bering and his team tested their idea by carrying out a somewhat strange experiment. In their study, students were asked to complete an intelligence test. The test had been carefully constructed to ensure that the students could cheat if they wanted to, and the experimenters could secretly monitor each person's level of deception. Just before taking the test, a randomly selected group of students was told that the test room was apparently haunted. As predicted by the "ghosts make people more honest" theory, the

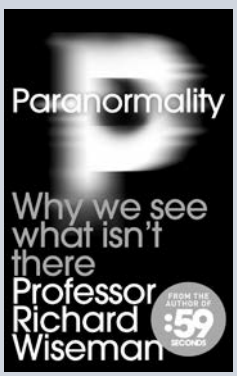
students who thought that they were in a haunted room were far less likely to cheat on the test.

However, perhaps the most popular theory to account for the evolution of ghostly experiences concerns the "Hypersensitive Agency Detection Device" (Barrett 2004). Oxford University psychologist Justin Barrett believes that the idea of "agency"—being able to figure out why people act the way they do—is essential to our everyday interactions with one another. In fact, it is so important that Barrett thinks the part of the brain responsible for detecting such agency often goes into overdrive, causing people to see human-like behavior in even the most meaningless stimuli.

In the 1940s, psychologists Fritz Heider and Mary-Ann Simmel conducted a now-classic experiment that provides a beautiful illustration of Barrett's point. Heider and Simmel created a short cartoon animation in which a large triangle, a small triangle, and a circle moved in and out of a box. They then showed the meaningless cartoon to people and asked them to describe what was happening. Most people instantly created elaborate stories to explain the cartoon, saying, for example, that perhaps the circle was in love with the little triangle, and the big triangle was attempting to steal away the circle but the little triangle fought back, and the small triangle and circle eventually lived happily ever after.

In short, people saw agency where none existed. Barrett believes that the same concept helps explain gods, ghosts, and goblins. According to the theory, many people are very reluctant to think that certain events are meaningless, and they are all too eager to assume that the events are the work of invisible entities. They might, for instance, experience an amazing stroke of good luck and assume it is angels at work, be struck down with an illness and see it as evidence of demons, or hear a creaking door and attribute it to a ghostly woman in white. If Barrett is right, ghosts are not the result of superstitious thinking. Neither are they spirits returning from the dead. Instead, they are simply the price we pay for having remarkable brains that can effortlessly figure out why other people behave the way they do. As such, ghosts are an essential part of our everyday lives. ■

On Publishing *Paranormality*



All of my previous books have been produced by large American publishing houses. However, when it came to my new book, *Paranormality* (www.paranormalitybook.com), the situation was different. Many major publishers were convinced that there simply isn't a market for a skeptical book about the paranormal. When no serious offers came forward, I decided to take a bold step. I will publish the unashamedly skeptical *Paranormality* as an e-book in America and have my U.K. publisher ship physical copies of the British book to the United States. It is a daring experiment, and I have no idea how it will work out. I don't have the large-market budget and connections of a large publishing house. However, I hope that I will have the support of the skeptical movement and anyone else who cares about science. Psychic hotlines and television shows are a multi-million dollar business. Many people do not want the American public to read books like *Paranormality*. For that reason alone, I believe that they deserve the largest audience possible.

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The Perpetual Quest

How to make a perpetual motion device and live to tell about it.

DIMITRY ROTSTEIN

Once upon a time, at the tender age of ten, I was playing with a magnet and an empty tin can. Suddenly I noticed that if I moved the magnet away from the can, with the distance between them remaining the same, the can rolled faster and faster in its pursuit of the magnet. But what if the can was rigged to the magnet, I thought? Obviously, the device would continue accelerating, without the aid of any outside force, at least until it hit the nearest wall. Three pencils and some duct tape were enough to constrain the magnet in front of the can at the desired distance. But to my great dismay, the resulting system remained completely motionless.

Undoubtedly, many people of the inventive type can relate to this experience—thinking up a seemingly ingenious idea for making a system that generates persistent motion with no energy source. Recorded propositions for building similar contraptions, usually called *perpetual motion devices*[1] or *perpetuum mobile* (PM for short), date back to at least the seventh century CE (Peter 2004). A plethora of mechanisms based on such ideas have been designed and built, ranging from the stunningly trivial to the ridiculously complex. Different though they may be, all share one common quality: much like my "magnetic can," they do not work.

Only in the nineteenth century were the culprits behind this perpetual failure (pun intended) discovered. These are the relentless laws of physics, or more specifically, the first and second laws of thermodynamics. One would expect that ever since these laws were established (with solid theoretical and overwhelming experimental basis), PMs would have become history. Surprisingly, that hasn't happened. In fact, even at the beginning of the twenty-first century, the PM "industry" isn't just alive and well but, arguably, more popular than ever before. And it's not just the "modern" kinds of PMs, like "zero-point modules"[2] or "torsion field generators,"[3] but the most classical ones too—the "overunity devices,"[4] which violate the first law of thermodynamics. In fact, at http://tinyurl.com/magnetPM you can see a grown man playing with magnets in almost the same way I did as a child. This is just one example, but many more exist. The forum at www.overunity.com alone lists more than 25,000 members (as of December 2010), most of whom describe themselves as overunity inventors, and YouTube contains hundreds, if not thousands, of videos showing supposedly working PMs of all kinds. And the numbers keep growing.

Of course, such a high interest in PMs is easily understandable. In light of the global energy crisis, pollution, and human-induced climate change, an inventor of a free and clean energy source would certainly become rich and famous beyond imagination. On the other hand, centuries of utter failure and PMs' scientifically proven impossibility should serve as an overwhelming demotivator. So, how can all these people still believe in PMs—and not just believe but waste a lot of time and effort in trying to build such machines?

There are several possible explanations. As the famous case of John Keely suggests ("Keely's Secret" 1899), some of the "inventors" of PMs might well be frauds who are looking for an overly naive investor or just seeking publicity. Others are simply ignorant about the abovementioned impediments, especially at first. But, judging from various forum discussions, the majority appear to be honest and knowledgeable in this particular field. These people sustain their beliefs in the manner typical of most pseudoscientists—by denying the validity of scientific laws (Choronzon 1991) and by postulating a grand conspiracy theory, which might explain all the seeming failures. According to this theory, working PMs are not only possible, but they have already been built and the truth has been suppressed for various reasons and by various means, ranging from hostile discouragement to physical elimination of the invention along with its inventor (Bearden 2009).

Of course, thorough arguments have been mounted against conspiracy theories in general and this one in particular (Volkay 2007). But overall, a good skeptic should rely on testable facts rather than abstract arguments as much as possible, no matter how well reasoned these arguments are. Fortunately, testing conspiracy theories—at least this particular one—isn't difficult (albeit potentially

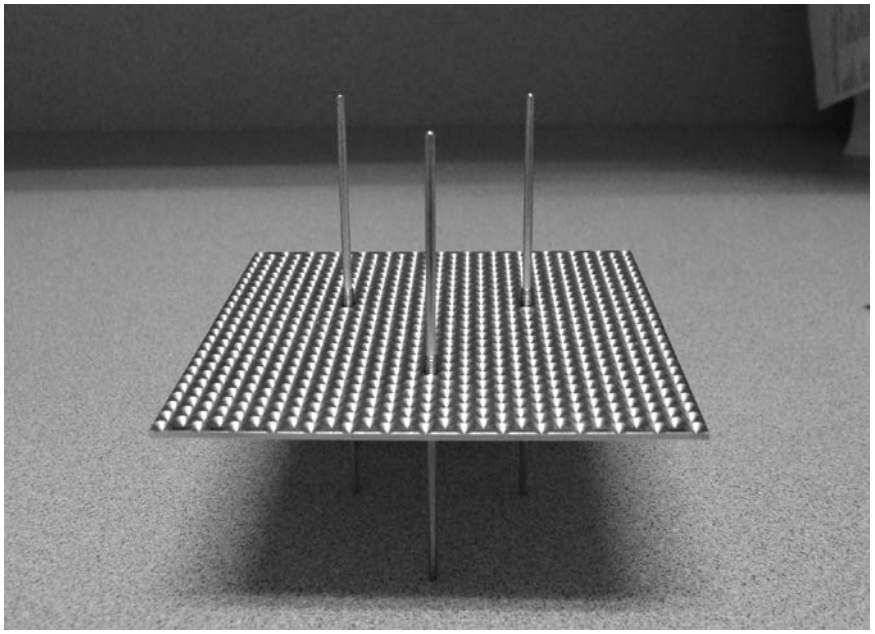

Figure 1. The "flying saucer"—or rather a plate (holes up).

lethal if the conspiracy theorists are correct), and I have done exactly that on two separate occasions.

The first opportunity came along in November 2007, during an annual technological competition called BizTec. Competitors had to submit a description of some novel invention of their own to be judged by a panel composed of industrialists, venture capitalists, and academic staff. The best proposals in terms of practicability, innovation, and commercialization would get a cash prize, but I was only interested in the judges' reaction to my proposal. According to the contest rules, every submitted idea—no matter how silly—would receive thorough feedback. For my submission I selected one of my own designs, which I had come up with awhile back. At the time of its conception, I even believed it was a valid idea for a short while before I realized it was just another PM. (It's so hard to criticize your own ideas.)

The idea is pretty straightforward. Imagine a simple saucer lying on a table. Both sides of the saucer are subjected to a constant and equal air pressure, so it doesn't move. But the air pressure is caused by the air molecules randomly bouncing off the saucer's surfaces. Now, suppose that the saucer's lower surface was shaped (on a microscopic level) in such a way as to reflect the air molecules in some specific direction rather than randomly. Then, the air pressure on this surface might be different from normal. Even if the pressure changed only by one percent, the resulting difference would be enough to lift the saucer itself, as well as a two-pound weight attached to it, off the table. Of course, this principle isn't new—it's just an unusual variation of an old PM concept known as Maxwell's demon, except that my PM doesn't have any moving parts. Richard Feynman showed that Maxwell's demon cannot work (Feynman et al. 1963), but his proof applies only to the moving trapdoors of the PM. So my design, having no moving parts, does appear to have a fighting chance of working; provided, of course, that we throw away the second law of thermodynamics, which explicitly forbids energy extraction from a static pressure.

According to the conspiracy folks, the judges at the competition, after seeing my proposal, had to make sure that I wouldn't build such a device. At best, they'd just laugh at my idea until I gave up and threw it away in frustration. At worst, they'd call the Men in Black to erase my memory or even my very existence. Needless to say, I'd prefer the first option. But their actual response was something I wasn't expecting at all: of some 150 submissions, ten received a $1,000 prize, my "flying saucer" being among those ten! The promised feedback was also quite encouraging. In all fairness, some judges did express their doubts that such a device could work, but they all liked the idea.

My experience is far from unique. Just a few months after the BizTec competition, designer Clay Moulton made headlines after winning a similar competition with his "gravity lamp" concept: a 600- to 800-lumen light source powered for a period of four hours by a slowly descending 50- to 100-pound weight (Moulton 2008). Simple high-school-level calculations show that these requirements correspond to the device having an efficiency of far beyond one hundred percent.

My second opportunity to test the conspiracy theory hypothesis came along a year after the BizTec competition. As part of my graduate training, I had to design and implement a laboratory experiment. Even though I came up with a few other interesting ideas, I decided to present my "flying saucer" first, again just to test the reaction of the professor in charge of the lab (hopefully not the "morph into an alien and devour me" kind of reaction). I was in for another surprise. Professor Yakov Krasik, the professor in charge, became excited about the idea and decided to go forward with it. Being a seasoned physicist, he of course recognized a PM at once, but that didn't seem to bother him. So we started building our "flying saucer."

Due to financial constraints, we couldn't reshape the surface on a microscopic level, so instead we made a macroscopic array of conic holes to concentrate the reflecting air molecules. Computer simulations showed that this should work,[5] provided that the air molecules didn't collide with each other while inside the holes (which would randomize their trajectories, destroying the alleged concentrating effect). To meet this condition, we put the whole contraption into a vacuum chamber and reduced the air pressure until the mean free path[6] of the air molecules became larger than the size of the holes (at about 10,000 times less than the normal air pressure). According to simulations, even under such low pressure the lifting force would be strong enough to be detected by high-precision scales. The experimental setting is shown in figures 1 and 2.

It should be noted that I only ran the experiment after I personally tested

the equipment to make sure that neither High Cabal nor Illuminati agents had messed with it. Naturally, there was no measurable difference in the plate's weight—with the holes facing up or down—at any pressure. Of course, if the results had been positive, then the second law of thermodynamics would fly out of the window faster than any flying saucer. Science prevailed once again when the saucer failed to work.

However, to my great surprise, Professor Krasik was genuinely disappointed by the negative result. I asked him whether he really believed this experiment could possibly have worked. After all, I told him right from the start that it couldn't, and I thought we were on the same page. This was his response: "I was almost sure that nothing [would] be positive, but … life is [a] complicated thing—and the more I'm working, the more I understand that not all what I know, or what I studied, is correct" (ellipsis in the original). Now, dear reader, I ask you this: does that really sound to you like someone who is trying to suppress anything? To me it surely doesn't.

No, I can definitely say that I have found no attempt at conspiracy. So, if no one has been able to build a working PM over the centuries, then perhaps the devices are indeed useless. Well, maybe *useless* isn't the proper word here. After all, a PM has already earned me (despite myself) a thousand dollars, some lab experience, and this journal publication. But do PMs really work or could they even possibly work? There's not much chance of that, I'm afraid.

Some may point out that a few isolated examples don't constitute a thorough study, and they'd be right. However, it takes only one whistleblower to expose a conspiracy (if it exists) and only one small hole in the wall of pigheadedness to push a radical idea through (if it's valid). I have discovered two such holes in the first two places that happened to come along. Not even once have I encountered any hostility or ridicule of the kind that PM proponents claim to suffer. If anything, my experience shows that the academy and the industry are more lenient toward PMs than they should be. This observation probably doesn't apply to most scientists and engineers, but the level of acceptance for PMs that I've witnessed is still surprising—if not troubling. As for the more extreme conspiratorial ideas, there is the undeniable fact that as I write these lines, I'm still very much alive. ■

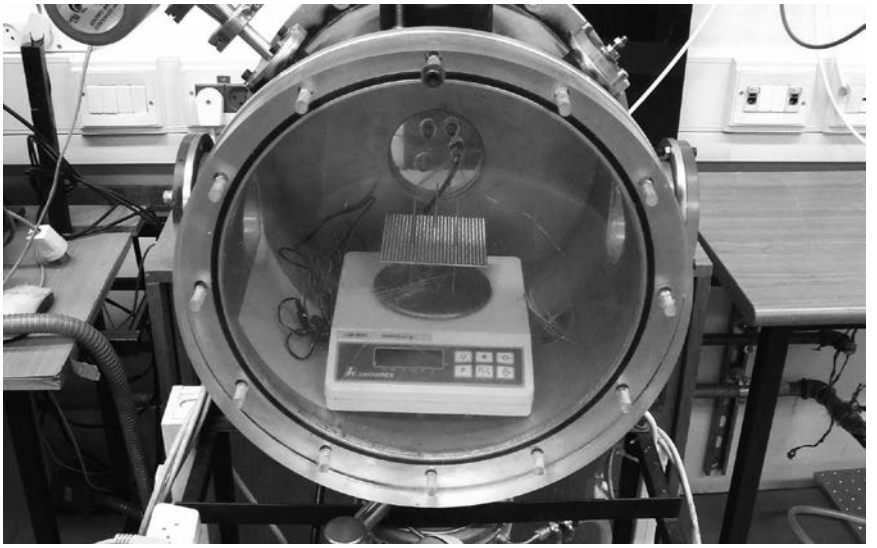

Figure 2. Vacuum chamber with the test "saucer" on the scales.

Notes

1. The term *perpetual motion device* is actually a misnomer because the existence of perpetual motion is assured by Newton's first law. A more proper name would be *perpetual motor* (still abbreviated PM), because the idea is to generate useful work from the perpetual motion, whereas the real perpetually moving object is useless in this respect. If you try to produce work from its motion, it will cease to move as soon as its initial kinetic energy is depleted.

2. The zero-point module (ZPM) is a hypothetical device that can utilize vacuum energy. According to quantum field theory, each point in space contains an enormous, perhaps even infinite, amount of energy. However, there is no scientifically plausible way to harness this energy, at least not without violating the existing laws of physics. Although some PM inventors claim to have constructed devices that use vacuum energy, the whole ZPM concept is regarded as pseudoscience or, at best, science fiction.

3. Torsion field theory, originally put forward by a few Soviet scientists, postulates an existence of fields unknown to science with amazing properties, among which is the ability to produce unlimited energy, antigravity, and faster-than-light travel. The theory (and resulting devices) is generally considered to be pure nonsense.

4. An overunity device is any system that produces more useful energy than it consumes. In technical terms, this means that its energy efficiency is greater than one or unity (i.e., more than 100 percent), hence the name "overunity." Such devices would obviously violate the law of energy conservation (the first law of thermodynamics) and thus are scientifically impossible.

5. It was discovered later that one of the formulas for the simulation was missing a sine factor, which explains the false-positive result. Of course it was obvious from the start (at least to me) that a simulation that produces nonphysical results must be flawed.

6. The *mean free path* is the average distance that an air molecule traverses before hitting another molecule. At normal air pressure, it's less than one-tenth of a micron. Reduced air pressure means fewer molecules flying around, hence the increase in the mean free path.

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Dimitry Rotstein, a graduate physics student at the Israel Institute of Technology, has had a lifelong interest in inventions and entrepreneurship. This is his second contribution to the Skeptical Inquirer.

The Flying Spaghetti Monster and the Pastafarian Quatrains

JONATHAN C. SMITH

I found God on Christmas in 2005. The *New York Times* had just reported a new web sensation, the Flying Spaghetti Monster (FSM). And like a twist of wet dangling spaghetti, my spiritual journey took a dramatic turn.

It had begun six months earlier. In the sleepy town of Corvallis, Oregon, unemployed twenty-five-year-old slot-machine technician Bobby Henderson had had enough. Frustrated with the Kansas Board of Education's push to teach the Biblical creation myth next to Darwin in biology classes, he demanded that his deity, the Flying Spaghetti Monster, receive equal classroom time. His now-famous letter (revered by Pastafarians as a Holy Document) proclaimed: "Let us remember that there are multiple theories of Intelligent Design. I and many others around the world are of the strong belief that the universe was created by a Flying Spaghetti Monster." Flying Spaghetti Monsterism, or Pastafarianism, caught on (Henderson 2006). Henderson's Church of the Flying Spaghetti Monster website (www.venganza.org) received millions of hits. Serious articles appeared in the *New York Times* and *Scientific American*. A new world religion was born.

Yes, I was moved, perhaps touched, by His Noodly Appendage. My winter vacation had started. Basking in the warm artificial glow of the fireplace in my local coffeehouse, I opened my new copy of Anagram Genius, a dangerous piece of software that mercilessly finds all legal anagrams for whatever phrase you desire. Just for fun, I plugged in words that seemed to fit my mood and the spirit of the season:

The Meaning of Life.

Eight anagrams (arranged into quatrains, to ensure credibility), caught my attention:

The fine game of nil.
Fame? I feel nothing.
Feeling fit? Ahem, no!
One fine lame fight.

Feel fate homing in.
O, female! Fine thing!
Fine gin, hot female.
The engine of a film!

Astonishingly, each line is a perfect anagram of "The Meaning of Life." And the message was obvious. Life is a game: a lame fight with no meaning. Fame and even health are empty. Fate rules. What is one to do? Drown oneself in gin and females. And note the sardonic conclusion: all of this is a sleazy grade-B plot, "the engine of a film!"

This is not how I wanted to start the great season of hope and joy. A persistent inner voice prompted my next step: "Feed the phrase 'Flying Spaghetti Monster' to Anagram Genius."

My trusty anagram generator needed four hours to spew out its assignment. However, the results were astonishing—like tablets, manna, or possibly pasta from heaven. The first anagrams (spaghettigrams) of "Flying Spaghetti Monster" formed something of a proclamation:

When not analyzing spaghettigrams, **Jonathan C. Smith** (aka Jon Smith) is a licensed clinical psychologist, professor of psychology at Chicago's Roosevelt University, and head of the Pseudoscience and Paranormal Lab. His recent book, *Pseudoscience and Extraordinary Claims of the Paranormal: A Critical Thinker's Toolkit* (Wiley-Blackwell, 2010), is emerging as a popular text in critical thinking. E-mail: jsmith@roosevelt.edu. Webpage: www.lulu.com/stress.

Finest might, sporty Angel,
Mostly fighting a Serpent.
Sting of almighty Serpent,
Petty mangler of insights,

Floating pestering myths.
Temptingly fights reason.
Fight gentlest parsimony.
Myth-generating flip-toss.

Again, each is a perfect anagram of "Flying Spaghetti Monster." At the time I was writing a textbook on critical thinking, pseudoscience, and the paranormal (Smith 2010). The quatrains seemed to comment on my writing. Who is the Angel? Obviously it is truth and reason, the main themes of my paranormal book. Who is the Serpent? The enemy of truth and reason: pseudoscientific thinking that mangles insights, floats pestering myths, and temptingly fights both reason and one of the most powerful tools of critical thinking: parsimonious analysis, or Occam's razor. And how does the serpent do this? By creating truthful-sounding myths out of the "flip-toss" of coincidence. Incidentally, I swear to god(s) this came from a dream. A voice instructed me to program Anagram Genius to generate only spaghettigrams containing the word *flip*. "Myth-generating flip-toss" is what I got.

Faced with such provocative insights, I feverishly devoted the three weeks of my vacation to unearthing spaghettigrams. It became an obsession, consuming four hours of coffee shop time every day, seven days a week. A remarkable epic began to unfold—a battle between reason and pseudoscientific delusion: the story of the Angel and the Serpent.

Before we get to the story, let us take a step back. Why should anyone take such anagrams seriously? The world's premiere anagram expert, William Tunstall-Pedoe (2007), has noted the uncanny and enigmatic meaningfulness of anagrams. It is indeed remarkable that:

Debit card = Bad credit
Slot machines = Cash lost in 'em
Dormitory = Dirty room
Christian = Rich at sin (or Rich saint),
Atheist = Eat shit, and
Skeptic = Sick pet (or It pecks).

Indeed, throughout history anagrams have been linked to deep mysteries (Curl 1996; Michaelsen 1998). It is possible that Hebrew Kabbalists believed anagrams contained secret mysteries. Some Nostradamus quatrains contain anagrams that continue to move and inspire people. Anagrams occur in the Bible. In sum, anagrams are true ("as a rare argument").[1]

I decided to treat the remaining spaghettigrams with archaeological respect—a twenty-first-century version of the Biblical Dead Sea Scrolls. Like many archaeological artifacts, the spaghettigrams emerged as fragments, which revealed a startling messaging as I pieced them together. I was driven by the truth that each came directly from the deity, the FSM. (Indeed, no other religion can make such a provable claim about its scriptures.) Together they form what I now call *Pastafarian Quatrains*. (Smith 2006, 2008). The epic battle between reason and delusion began to unfold.

The Preparatory Stanzas

The first quatrains warn that pseudoscientific thinking often poses as a wise angel. However, we should be skeptical of gospels that superficially appear plausibly angelic but are nevertheless false. These gospels may seem to be "fine songs," but they are actually "mighty, tempting, nagging, flimsy prattle."

Fine songs, mighty prattle,
Lengthy figmentary posts,
Angry song, emptiest filth.
Temptingly soft singer? Ha!

Salty might of presenting?
This flimsy, potent nagger.
"Angel's" gift or inept myths?
Petty insights from "Angel."

The stifling, empty groans.

But the quatrains then warn against getting too upset about pseudoscientific attempts masquerading as reason. Anger can get in the way of productive discussion concerning matters paranormal:

This petty gem of snarling.
Self-tormenting, pithy gas.
This flimsy, potent nagger.
Might of petty gnarliness.

Snarl! Shifty, tempting ego.
Empty sage snorting filth.
Snotty, if angriest, phlegm.
Angry flight to emptiness.

The Passion Quatrains

Perhaps as a sign of its truthfulness, the Pastafarian Quatrains rival the Holy Bible's stories of passion and lust. The beautiful and poetic Passion Quatrains vividly portray the risks of courting delusional intellectual attachments, here symbolized as passion.

This frosty pig gentleman,
Tormenting shapely gifts.
Phony flirt gets steaming,
Then flings petty orgasm.

Filthy G-String Poets. Amen!
Manly poet, G-String fetish.
Fetish groans temptingly.
Penalty of thirsting gems.

Tempting 'n' flashiest orgy?
Tempting 'n' faithless orgy.
Self-pitying tenth orgasm.
Hot self-pity G-string. Amen!

Finest G-string, empty halo.
The nails of empty G-string.
Fat, slimy pestering thong.
The self-pity G-string moan.

Finest porn gets almighty.
If mighty angel tests porn . . .
Porn feigns stately might.
Gnarliest of empty nights.

Yes, each line is a perfect anagram of "Flying Spaghetti Monster." But I was a bit troubled by the obsession with G-strings. Perhaps they are a metaphor for pseudoscientific delusion that binds and entraps . . . like an empty G-string? And is porn a derisive metaphor for pseudoscientific delusion? I'll leave such deeper interpretations to Pastafarian scholars. I wish to say no more about the Passion Quatrains.

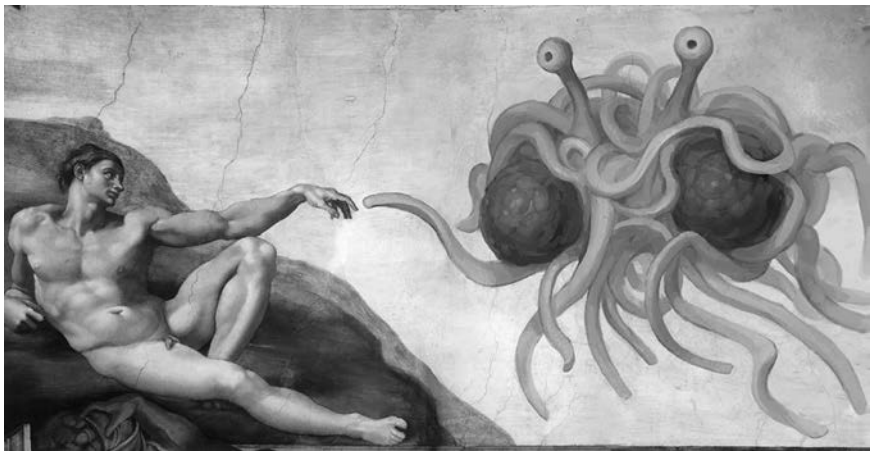
Incidentally, the Pastafarian Quatrains even contain a study guide:

Fragment this tiny gospel.
Trash tiny figment "gospel."
Spot thrifty gems in Angel,
Itsy gem of plain strength.

On fighting messy prattle:
Test gingerly, if phantoms.
Parse intently, fight smog.
Forget anything misspelt.[2]

The Pastafarian Epic

After having prepared us extensively, the Quatrains return to the epic story. We meet our hero, the Pig. The Pig has been a literary figure of archetypal significance, ranging from the whimsical



Porky Pig and Miss Piggy to the tragic Wilbur of *Charlotte's Web* and the equally tragic Three Little Pigs. Then there is skeptical scholars' soaring and mythic Pigasus (James Randi's Pigasus Awards). Remember Pigasus. He is the Key to the Quatrains.

Pig is first tormented by, and then confronts, the tempting cheap ("toy") claims of pseudoscience:

Fine Piggy halts torments!
Halts firey, tempting song.
Pig snarls, "The figment toy!"
"I'm tipsy of Angel Strength!"

Our Pig fable has an astonishing deeper message. It is my scholarly opinion that our hero Pig is the classic icon of paranormal discourse, Pigasus, and that Pigasus is indeed a partner and friend of the Flying Spaghetti Monster. This is its stirring "thrifty (parsimonious) gem song." Consider the startling final quatrains.

Amen! Thrifty Piglet's song!
Plainest thrifty gem song.
A poem fights stringently.
Spin to Angel's thrifty gem!:

"Am hot, sternest Flying Pig!"
"Hot, tense, smart Flying Pig!"
"Flying Pigs threaten Most!"
"Flying Pigs!—The Neat Storm!"

Song fights prettily. Amen!
The Flying Pig's smart note.
Flying Pig met Honest Star . . .
Flying Spaghetti Monster!

Flying Pig's Anthem . . . or test?

It is remarkable that among all of the world's faux deities, only the FSM and Pigasus are linked.[3] But are the Pastafarian Quatrains an anthem celebrating the victory of truth over delusion, or has the struggle just begun?

> Through patternicity we see ghosts in shadows, the man in the Moon, and even messages in batches of anagrams.

The Deeper Message of the Flying Spaghetti Monster

It is beyond dispute that the Pastafarian Quatrains are words that come directly from the deity, uncontaminated by human hands and fingers. I have offered them as a profound source of meaning that surely rivals any holy book. However, critical thinkers may protest. First, most people probably would not guess the number of legal anagrams Flying Spaghetti Monster yields—3,200,000. We all underestimate probabilities and the likelihood of coincidence. With an enormous pool of anagrams, the Law of Very Large Numbers—augmented by confirmation bias—suggests that one can readily select a few dozen that appear to tell whatever story we may desire or expect. Selective perception makes the process almost automatic as we notice supportive details. Through patternicity we see ghosts in shadows, the man in the Moon, and even messages in batches of anagrams.

The Pastafarian Quatrains are an object lesson in faulty thinking. Indeed, in honor of His Holiness, Bobby Henderson's Flying Spaghetti Monster, we might label such attempts at pseudoscientific analysis as "noodly thinking" or perhaps just "intellectual spaghetti." However justified skepticism may be, I still believe the FSM and His Pastafarian Quatrains are truly an unparalleled spiritual achievement. The FSM merits elevation to the pantheon of faux paranormal entities, which includes Russell's Teapot, the Invisible Pink Unicorn, the Great Pumpkin, the monster under the bed, and the Ceiling Cat. ■

Notes

1. If you think this is not a serious essay or that I am just being silly, note these ominous spaghettigrams:

Penalty of tight grimness.
Needing nice comicalness

2. Good advice, given that the Quatrains tend to ignore the niceties of grammar. (Note that translators of ancient texts, such as Egyptian hieroglyphs or the Dead Sea Scrolls, have faced similar problems.)

3. The FSM is gay-affirming. Indeed, it is divinely written that the Flying Spaghetti Monster is *Fine, slim, top, gay strength*.

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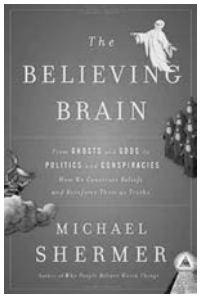
Why Belief Always Comes First

HARRIET HALL



The Believing Brain: From Ghosts and Gods to Politics and Conspiracies—How We Construct Beliefs and Reinforce Them as Truths
By Michael Shermer. Times Books, New York, 2011. ISBN: 0805091254. 400 pp. Hardcover, $28.

A common question from skeptics and science-based thinkers is "How could anyone believe that?" People do believe some really weird things and even some obviously false things. The more basic question is how we form all our beliefs, whether false or true.

Michael Shermer's book *Why People Believe Weird Things* has become a classic. Now he has a new book out: *The Believing Brain: From Ghosts and Gods to Politics and Conspiracies—How We Construct Beliefs and Reinforce Them as Truths*. It synthesizes thirty years of research into the questions of how and why we believe what we do in all aspects of our lives.

Some of the content is repetitious for those of us who have read Shermer's previous books and heard him speak, but the value of the new book is that it incorporates new research and puts everything together in a handy package with a new focus.

Shermer writes, "I'm a skeptic not because I do not want to believe, but because I want to know. How can we tell the difference between what we would like to be true and what is actually true? The answer is science." He includes a pithy quotation from Richard Feynman that I had not seen before: "If it disagrees with experiment, it is wrong. In that simple statement is the key to science. It doesn't make any difference how beautiful your guess is, how smart you are, who made the guess, or what his name is. If it disagrees with experiment, it's wrong. That's all there is to it."

Our schools tend to teach what science knows rather than how science works. The scientific method is a teachable concept. But, Shermer writes, "our most deeply held beliefs are immune to attack by direct educational tools, especially for those who are not ready to hear contradictory evidence." This is a problem, and Shermer does not offer a solution.

The brain is a belief engine. It relies on two processes: patternicity and agenticity. It finds meaningful patterns in both meaningful and meaningless data. It infuses patterns with meaning and imagines intention and agency in inanimate objects and chance occurrences. We believe before we reason. Once beliefs are formed, we seek out confirmatory arguments and evidence to justify them. We ignore contrary evidence or make up rationalizations to explain it away. We do not like to admit we are wrong. We seldom change our minds.

Our thinking is what Morgan Levy has called "intelligently illogical." If our ancestors assumed that the wind rustling the bushes was a lion and they ran away, that wasn't a big problem. If there really was a lion and they didn't run away, they were in trouble. Natural selection favors strategies that make many false causal assumptions in order to not miss the true ones that are essential to survival. Superstition and magical thinking are natural processes of a learning brain. People believe weird things because of our evolved need to believe non-weird things. As Shermer writes, "Belief comes quickly and naturally, skepticism is slow and unnatural, and most people have a low tolerance for ambiguity."

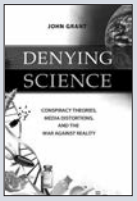
Natural selection favors strategies that make many false causal assumptions in order to not miss the true ones that are essential to survival.

We rely on a feeling of conviction, but that feeling can be uncoupled from good reasons and good evidence. Science hopes to counteract false beliefs by recoupling through counterarguments with even better reasons and evidence.

As science advances, the things we once thought of as supernatural acquire natural explanations. Thunderstorms are caused by natural processes of electricity in clouds, not by a god throwing thunderbolts.

Listing does not preclude future review.

DENYING SCIENCE: Conspiracy Theories, Media Distortions, and the War Against Reality. John Grant. Prometheus Books, Amherst, New York, 2011. 350 pp. Hardcover, $25. Author John Grant, who has previously written books on bogus, corrupted, and discarded science, here takes on the denialism of science and its prevalence in today's society. Whether regarding AIDS, vaccines, evolution, climate change, or half a dozen other topics, he reports on and considers why denialism in the supposedly advanced country of the United States is rampant. The opening chapter is "God Told Me to Deny," and the two final chapters deal with the marketing of climate change denialism and its main proponents.



THE FALLACY OF FINE-TUNING: Why the Universe Is Not Designed for Us. Victor J. Stenger. Prometheus Books, Amherst, New York, 2011. 285 pp. Hardcover, $28. Physicist Stenger, author of previous valuable books examining and debunking such things as quantum consciousness and even God ("the failed hypothesis"), here takes a sharp razor to the idea, widely prevalent even among many highly educated people, that the universe has been fine-tuned just for us. He says much of the confusion is based on misunderstandings of the science, and he provides plausible reasons for why the various scientific constants have the values they have by following existing standard models of physics and cosmology. A thorough and sophisticated exploration of a highly relevant and important topic.

AND GOD SAID, 'LET THERE BE EVOLUTION!': Reconciling the Book of Genesis, the Qur'an, and the Theory of Evolution. Charles M. Wynn, Sr. and Arthur W. Wiggins, editors. All Things That Matter Press, 2011. 191 pp. Softcover, $16.99. Accepting evolution, a fundamental tenet of biological science, does not require abandoning one's faith, the editors of this volume, both scientists, strongly believe. They invited a Jewish scientist, David Kay;

Belief in God is hardwired into our brains through patternicity and agenticity. We see patterns even when they are not there (the Virgin Mary on a toasted cheese sandwich, for example), and we interpret events as having been deliberately caused by a conscious agent (some people believe the AIDS virus was created in a government lab for genocidal purposes). God is the ultimate pattern and agent that explains everything. And religious belief had survival value for human groups in the past, encouraging conformity, group cooperation, and altruism.

Shermer covers a variety of subjects—from alien abductions to cosmology, from economics to politics, from belief in the afterlife to evolution, from ESP to morality—with a lot of entertaining examples. He doesn't give much space to medical topics, but he does mention AIDS denialism, the vaccine/autism brouhaha, and alternative medicine, which he calls "a form of pseudoscience."

Conspiracy theories abound, from Holocaust denial and the 9/11 Truth movement to suspicions about the origin and spread of AIDS. This is a result of wide-open pattern detection filters and the assumption that there must be a conscious agent behind everything. Shermer provides a handy list of ten characteristics of a conspiracy theory that indicate that it is likely to be false; for instance, the more people who would have to have been involved in a cover-up, and the longer the alleged cover-up has lasted, the less likely it is that no one would have spilled the beans by now.

The book provides a useful discussion of the various biases we are prone to, from confirmation bias to the status quo bias, and points out that science is the ultimate bias-detection machine. Shermer revisits the "Gorillas in Our Midst" video (available online at http://viscog.beckman.illinois.edu/flashmovie/15.php) to remind us that we often don't see things that we're not looking for. (In case you don't know, the video was part of an experiment demonstrating inattentional blindness: a gorilla walks through a group of people playing basketball, and we don't see him because our attention is fixed on counting the number of times the players in white shirts passed the ball.) Shermer quotes Upton Sinclair: "It is difficult to get a man to understand something when his job depends on not understanding it."

I particularly got a kick out of one of Shermer's examples. Galileo used an early telescope to observe four moons around Jupiter. One colleague of Galileo's refused to even look through the telescope, calling it a parlor trick, saying he didn't believe anyone else would see what Galileo saw, and saying that looking through glasses would only make him dizzy. Other colleagues who did look were similarly dismissive; one tested the telescope in a series of experiments and said it worked fine for terrestrial viewing but when pointed at the sky it somehow deceived the viewer. One professor of mathematics accused Galileo of putting the moons of Jupiter inside the tube.

We are beginning to develop a new understanding of how the brain generates beliefs and reinforces them. *Star Trek*'s Mr. Spock is science fiction; humans are often illogical and emotional. We need emotion to motivate us and help us function. An emotional leap of faith beyond reason is often required for us to make decisions or even just to get through the day.

This thought-provoking book is a good read and a good reference. Takeaway lessons:

- Beliefs come first, reasons follow.
- False beliefs arise from the same thought processes that our brains evolved to enable them to learn about the world.
- Our faulty thinking mechanisms can't be eliminated, but our errors can be corrected by science. ■

Harriet Hall, MD, also known as "The SkepDoc," is a retired family physician who writes about pseudoscience and questionable medical practices. She is a SKEPTICAL INQUIRER contributing editor and a weekly contributor to the *Science-Based Medicine* blog, on which this review originally appeared (www.sciencebasedmedicine.org/index.php/the-believing-brain/).

Eight Impediments to Rationality

PETER LAMAL

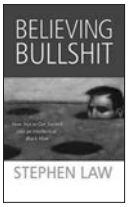
In his new book, Stephen Law describes eight strategies or mechanisms that draw the unwary and uninformed into intellectual black holes from which escape can be very difficult (and for some, impossible). He describes each strategy and explains what is wrong with it and how it is used. No doubt Law, a University of London philosopher, is right when he asserts that almost all of us engage in at least some of these strategies to some extent, particularly when our strongly held beliefs are threatened by rational analysis and countervailing evidence. And there may be no cause for concern if we sometimes use them in moderation.

At the outset Law draws a distinction between the content of intellectual black holes, which he does not label bullshit, and the *manner in which the content is defended and promoted.* The latter is bullshit. The ability of intellectual black holes to capture us does not depend upon the beliefs at their core.

One of the main focuses of the book concerns intellectual challenges to belief in God and the strategies used in response to the challenges, particularly the evidential problem of evil and the problem of nontemporal agency. The problem of evil concerns the traditional God who is all powerful, all knowing, and all good. The challenge is this: Why does evil exist if there is such a God? The evidential problem of evil, Law's particular concern, questions the existence of God because there is not simply some but rather an enormous amount of evil in the world.

The problem of nontemporal agency results from the belief that God is not a temporal being—God does not exist in time. But God can create space and time only if there already exists time in which he (she? it?) performs the creation.

These two challenges to belief in God cannot be successfully met by



Believing Bullshit: How Not to Get Sucked into an Intellectual Black Hole
By Stephen Law.
Prometheus Books, Amherst, New York, 2011.
ISBN: 978-1-61614-411-1.
271 pp. Paperback, $19.

means of the bullshit strategies Law describes.

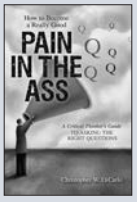
Law labels the first strategy "Playing the Mystery Card." This strategy is often used in defense of beliefs in the supernatural. It often involves a veil analogy: beyond the observable world is a mysterious reality hidden from us as if it were behind a veil. And science cannot reveal what lies beyond the veil. In this chapter Law describes how some supernatural claims may be refutable, even empirically refutable, whether or not they are, strictly speaking, scientifically refutable.

The "But It Fits" strategy is illustrated by the idea of young-earth creationism, according to which God created the universe—including the earth and every living species—over six days less than ten thousand years ago, as described in Genesis. Some polls show that about 45 percent of U.S. citizens believe in young-earth creationism. This illustrates that any belief, no matter how ludicrous, can be made consistent with the available evidence, given some patience and ingenuity.

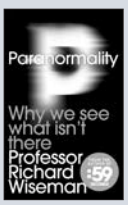
The "I Just Know!" chapter focuses on religious and psychic claims. Many theists, for example, say they do not believe on the basis of evidence; they "just know" God exists. Law, in contrast, cites evidence that most psychic and religious experiences are delusional. With respect to the latter, he cites the fact that religious beliefs tend to be specific to cultures—Muslim versus Christian being an obvious example. Also, religious beliefs often contradict each other. Some Buddhists

a Christian scientist, astronomer Howard Van Till; and a Muslim scientist, pediatrician T.O. Shanavas, to present scientific evidence for evolution and then explain how they reconcile their support for evolution with the scriptural sources and beliefs of their religions. It is a fresh contribution to the discussion about science and religion.

HOW TO BECOME A REALLY GOOD PAIN IN THE ASS: A Critical Thinker's Guide to Asking the Right Questions. Christopher W. DiCarlo. Prometheus Books, Amherst, New York, 2011. 340 pp. Softcover, $19. The title tells the story here, and philosopher DiCarlo contends that becoming that pain in the ass is and should be a mark of distinction, because it means you have learned to think critically. He wittily discusses biases, argumentation, fallacies, evidence, and the Socratic method of questioning and explores questions such as: What can I know? Why am I here? How should I behave? What is to become of me? It is a fine guide to analyzing your own thoughts and beliefs and questioning beliefs and assumptions of those who claim to know what they're talking about.



PARANORMALITY: Why We See What Isn't There. Richard Wiseman. Macmillan, London, 2011. 341 pp. Softcover, UK £12.99. U.S. Kindle edition, $8.99. The irrepressible U.K. psychologist (and SI consulting editor) Richard Wiseman here explores "the hidden world of supernatural science." Paranormal phenomena don't exist, Wiseman believes, but that doesn't mean the topic isn't worth researching and exploring. He takes the reader to meet a colorful cast of characters, including expert illusionists, charismatic cult leaders, and mediums holding séances. It's a world where, as he says, anything appears possible and yet nothing is ever quite what it seems. Topics include fortune-telling, out-of-body experiences, mind over matter, ghost-hunting, mind control, and prophecy. He brings the reader into the topics by including experiments you can do yourself to measure your powers of intuition, assess your suggestibility, and find out if you are a natural-born liar. See Wiseman's related article in this issue on page 46.



—Kendrick Frazier

do not believe in a personal god whereas Christians, Jews, and Muslims do.

Do you want to impress others with your profundity? Check out the "Pseudo-profundity" chapter. Learn to state the obvious and to contradict yourself so as to come across as profound. Use jargon. Make up words that appear to have meanings similar to those of well-known terms but differ from them in some way that is never fully explained. For example: "Don't talk about people being sad or happy; talk about them having 'negative or positive attitudinal orientations'" (164). Use scientific terms or references. References to quantum mechanics are particularly popular with those peddling pseudoscience. The postmodernists' writings are prime examples of pseudoprofundity.

The other intellectual black holes Law describes are: "Going Nuclear," "Moving the Semantic Goalposts," "Piling Up the Anecdotes," and "Pressing Your Buttons."

Law's final chapter includes a table listing the eight strategies and nine kinds of belief (for example, homeopathy and psychic powers) and indicating which beliefs tend to result from which strategies.

The book concludes with "The Tapescrew Letters: Letters from a Senior to a Junior Guru," a parody of C.S. Lewis's *The Screwtape Letters*.

I suspect that Law would agree with my hypothesis that belief in God and a blissful afterlife is based on emotion, which provides comfort in an often brutal and unfair world. And emotion is often immune to reason.

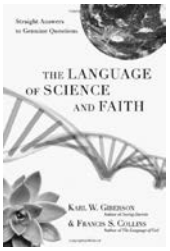
Conventional wisdom among many book reviewers seems to be that reviewers should have at least some, even if minor, negative comments about books that they otherwise positively review. If this is a bullshit belief I have avoided it with this review. ■

Peter Lamal is an emeritus professor in the Psychology Department of the University of North Carolina—Charlotte. He is a fellow of the Division of Behavior Analysis of the American Psychological Association and a member of the Association for Behavior Analysis International.

A Flawed Attempt to Reconcile Religion and Science

JIM CLARK

In *The Language of Science and Faith: Straight Answers to Genuine Questions*, two Christian scientists, Karl W. Giberson and Francis S. Collins, attempt to bridge the oft-trumpeted chasm between religion and science. Neither their religiousness (albeit broadly defined) nor their scientific credentials can be challenged, and the latter in particular is often a problem in other such works. Collins, for example, headed the group that first mapped the human genome and is currently director of the National Institutes of Health.



The Language of Science and Faith: Straight Answers to Genuine Questions
By Karl W. Giberson and Francis S. Collins. Intervarsity Press, Downers Grove, Illinois, 2011. ISBN: 978-0-8308-3829-5. 224 pp. Hardcover, $20.

One Christian website ... refers to the book as "throwing the Bible under the bus."

The scientific community will certainly respect the sections of this book that quite rightly refute many religious fundamentalist criticisms of evolution and related science. The authors point out that these criticisms are generally based on outdated science or profound misunderstandings of science. As an example of the former, some early criticisms of evolution were based on incorrect estimates of the age of Earth. It was argued, in essence, that Earth was not old enough to permit the gradual emergence of new species that is called for by evolutionary theory. Subsequent and more accurate estimates overcame this difficulty as accepted figures for Earth's true age increased markedly.

With respect to misunderstandings about science, Giberson and Collins point out that some criticize evolution as being incompatible with the second law of thermodynamics. But this criticism makes the incorrect assumption that the second law, which applies only to closed systems without external influences, is relevant to open systems like nature.

The authors are therefore on firm ground with the scientific community when they endorse widely accepted scientific theories, although some believers may be reluctant to acknowledge the primacy of science as a source of knowledge about the world. And many scientists may part ways with the authors as well when they insinuate a Christian God into these natural processes.

The book identifies two mechanisms for God's intervention via putatively scientific means. First, God set events in motion at the time scientists label "the big bang" in such a way that the universe and world would unfold in the way that it did, including the ultimate emergence of humans through evolutionary processes. Second, God can tweak evolutionary processes at the level of genetic mutations to steer evolution in directions that God deems desirable.

Not only will these notions be questioned by many scientists as unnecessary, but they are also unlikely to resonate with traditionally religious people's views about how God acts. Many people of faith will be reluctant to give up the idea of an active God who works

through miracles, responds to their prayers, and otherwise exerts influence on the world in mystical ways rather than by the quasi-naturalistic processes emphasized by Giberson and Collins.

Indeed, traditionally religious people will have to forsake much that they hold sacred if they are to adopt the reconciliation proposed in this book. Other sections of the book, for example, address supposed incompatibilities between religion and science, arguing that these can arise from misinterpretations of the Bible, which the authors view as a complex text requiring a hermeneutical approach to its understanding—that is, the Bible must be read analytically with careful consideration to the context in which it was written and its intended audience. To illustrate, the fact that Genesis contains two differing accounts of creation is taken by Giberson and Collins to indicate that the writer intended a figurative or theological interpretation rather than a literal description of creation. The degree to which traditional Christians will find such liberties intolerable is suggested by one Christian website that refers to the book as "throwing the Bible under the bus."

In addition to these efforts to demonstrate the compatibility of science and religion, the authors argue further that contemporary science actually supports a belief in God. Their case rests primarily on the fine-tuning argument, which is distinct from the better-known notions of intelligent design and irreducible complexity, which the authors dismiss—in the process likely alienating yet another religious community.

The fine-tuning argument holds that some numerical quantities describing certain aspects of the physical world are extraordinarily well-suited to the emergence of life, that even the slightest deviation would prevent the development of life, and that this fit is so improbable as to suggest some intelligence (i.e., God) is behind the universe.

In addition to the lack of correspondence between this notion of God's influence and traditional religious views, the argument falters on scientific grounds. Physicist Victor Stenger recently published a book titled *The Fallacy of Fine-Tuning: Why the Universe is Not Designed for Us.* To illustrate one counterargument, some constants are finely tuned for the emergence of life only at this particular point in time; a considerable range of values could actually produce life billions of years in the past or in the future. And the supposed fine-tuning of other constants is shown to follow naturally from a scientific account of our expanding universe.

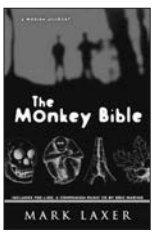
Finally, the book expounds a support for Christianity in particular that obviously is derived from the authors' personal religious beliefs rather than from any evidence. Many arguments in this book are not specific to Christianity, despite repeated and often gratuitous allusions in the book to the Bible and Christian beliefs. Even if the universe was fine-tuned, for example, it could be taken as evidence for any deity with intelligence—not necessarily the Christian God.

In conclusion, the attempted reconciliation of religion and science involves a highly idiosyncratic view of both science and Christian religion, especially the latter. I therefore doubt that this book will persuade or satisfy many people, except perhaps a small minority whose idiosyncratic Christianity and theistic views of science already correspond closely to those of the authors. ■

Jim Clark is professor of psychology at the University of Winnipeg. As a cognitive psychologist and teacher of research methods, he has had a long-standing interest in understanding the human processes entailed in science and in addressing putative challenges to the efficacy of these processes for furthering understanding of our physical, societal, and psychological worlds. Religion constitutes the basis for a number of such challenges.

A Modern Fable about Science and Religion

JOE SZIMHART



The Monkey Bible: A Modern Allegory
By Mark Laxer. Outer Rim Press, Burlington, Vermont, 2010. ISBN-13: 978-0-9638108-0-9. 243 pp. Hardcover, $25.

The Monkey Bible is a modern fable for those who find themselves on a path of conflict between religion and science, which covers much of the human race throughout its history. In other words, there is a lot to chew on here for the reader, especially one with limited familiarity with evolutionary biology and its opposition in fundamentalist religion. The fable is a cry for resolution before it is too late, before the naked ape's closest animal relatives, the great apes, disappear in the wild. *The Monkey Bible* also launches a manifesto, a project, and a mission that is accompanied by music on a compact disc included with the book and an interactive website complete with videos. Mark Laxer takes the reader for an educational ride through the ongoing arguments about missing links, creationism, evolution, the Christian Bible, the biological tree of life, genes, heredity, God, and the god-of-the-gaps for what science has not yet proved about biological evolution. Fear not; the ride is not too complex or dizzying. It remains prudently parsed and energetically entertaining throughout as we follow the mostly young-adult characters in their quest.

Through its main characters, Em-

manuel, Lucy, and Evelyn, *The Monkey Bible* shows the importance of preserving the quality of our lives and our futures on this planet. The characters' plea is for science and religion to come together to preserve and enhance habitats—not only for the great apes but also for all viable speciation. Chimpanzees are especially featured in the story when the college-age male protagonist, Emmanuel, discovers secret evidence in a paper authored by his father that he is part chimp. His simian looks (excessive hair, long and powerful arms, and short legs) are, he comes to believe, the result of a genetic experiment. Indonesian scientists under President Suharto's direction inserted chimpanzee genetic material into the embryo that became Emmanuel. Emmanuel's parents raised him as a strict Christian—indeed, the Bible was his favorite book—but the shocking revelation of his chimp nature throws him into a dilemma: If he is truly an animal (or less than 100 percent human), does the salvation promised in the New Testament apply to him? Animals, after all, are not allowed into his church and do not have souls that can be saved.

Emmanuel's witty companion Lucy, who has a working knowledge of all things evolutionary, learns of Emmanuel's dilemma and determines to help him come to grips with reality. She devises a plan to take him to Africa to meet his chimp relatives who are dying out as a wild species. On the way they stop at universities and organizations to consult with significant researchers and scientists who address the plight of the apes and the theory of evolution, among them Jane Goodall and Richard Dawkins. Another friend, Evelyn, who is quite Christian, also wants to help by exploring how religion can better accommodate preservation of species and the theory of evolution. Although she does not travel with Lucy and Emmanuel, her role of examining how religion can accept evolution and support life on Earth is a key feature in the story.

The characters' plea is for science and religion to come together to preserve and enhance habitats—not only for the great apes but also for all viable speciation.

Early in the story we meet Ana Mayd, a kind of wise crone suffering from cancer whose advice echoes the "follow your bliss" slogan coined by mythologist Joseph Campbell. Ana suggests to the young protagonists that they should take their stories for a "journey" to allow their bliss to reveal itself. On the way, Lucy decides to save Emmanuel by inventing a new bible that she claims to channel from UG (or the Unlikely God). Unfortunately, her finished effort is all but destroyed in a fire, so all we are left with are Lucy's recollections at the end and fragments revisited on actual glossy pages of *The Monkey Bible*. The fragments nevertheless are enough to boost the essence of Lucy's mostly science-based revelations.

Laxer's relatively short novel deserves a second read, as it is dense with reflections on solid evolutionary science and the religious question. Fundamentalists and racists of any stripe may find this book disturbing to the point of tossing it aside before finishing it. The book should appeal to folks in both secular and religious camps, people reasonable enough to appreciate its message—God probably helps those who help themselves and use science ethically. Also, apes deserve a protected life on Earth or we might just disappear along with our close cousins.

I enjoyed the read and especially noted Laxer's not-so-subtle names of his characters. Emmanuel means "God with us." Evelyn reflects Eve, the biblical mother of us all. And Lucy is "light" or "wisdom" as well as the name given the bones of the hominid *Australopithecus afarensis*, a scientific candidate for our most original mother. Mark Laxer runs a software corporation, a storytelling gathering, and a wildlife conservation organization. In his first book, *Take Me for a Ride: Coming of Age in a Destructive Cult* (1994), Laxer narrates his youthful entanglement with guru Frederick "Rama" Lenz (see my review of Lenz's novel *Surfing the Himalayas* in the January/February 1998 SI, available online at www.csicop.org/si/show/snow_job_in_the_himalayas). ■

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Magnetic Misrepresentations: Falling Prey to Drivel

As a family physician, I am disheartened by the invasion of prescientific practices into medicine and even into our medical schools, which I have no doubt has Abraham Flexner rolling in his grave. I therefore found Mielczarek and Araujo's piece on therapeutic touch (TT) and magnetic fields ("Power Lines and Cancer, Distant Healing and Health Care," SI, May/June 2011) uplifting.

Well done and thank you. The concern over electromagnetic radiation is analogous to the ongoing controversy regarding cell phones and brain cancer, and Mielczarek and Araujo's article adds another compelling reason to reject the claims of those who advocate treatment via "energy fields." I would have thought Emily Rosa's blinded test of experienced TT practitioners, who were asked to state whether the investigator's unseen hand hovered above their right hand or their left hand, settled the issue ("A Close Look at Therapeutic Touch," *Journal of the American Medical Association*, April 1, 1998). The practitioners all agreed prior to testing that this would be a fair measure of their skills. They scored worse than chance, guessing correctly only 44 percent of the time. Despite this, practitioners simply trashed the study and TT has flourished.

To my knowledge, not one quality study has been done since then to test this controversial treatment. Why not? In 1996 the James Randi Educational Foundation offered a prize of over $700,000 to anyone who could prove he or she could detect a human energy field. The foundation sent invitations to over sixty individuals and organizations across the country. Only one individual responded, claiming only limited "powers," and flunked the test. It seems, regardless of how outspoken they are to others, many believers have their own doubts and know that they would fail a properly conducted test of their claims.

I wonder if, engaged in debate, a TT practitioner might brush off a description of the "energy field" as magnetic in nature. He or she might say something to the effect of "we don't know the nature of the energy or how to measure it scientifically. All we can say is that we can feel it and TT works. Science doesn't have all the answers." Several logical fallacies are contained within that short statement, and that is the problem. Logic appears to have no effect on believers in alternative medicine. It is more a matter of belief akin to religion or magic. I also suspect there is an element of rebellion against the scientific and medical establishments. Of the three steps forward and two steps back that is scientific progress, the two steps back are what make the papers and make many throw up their hands in frustration, concluding that science is a useless hodgepodge of conflicting studies.

Rather than hazing pre-med students with advanced calculus and other superfluous courses, there needs to be a shift in medical education to emphasize critical thinking, logic, ethics, and other topics that are fundamental to preventing otherwise highly intelligent individuals from falling prey to such drivel. This education needs to begin early on—certainly before medical school and even as early as the first few years of grade school. Without giving people the tools to make reasoned judgments about such matters, the battle will be lost.

Courageous individuals in medicine and its allied professions, especially those in a position of power, need to step up and challenge these bogus ideas and press for reforms in education. But it is so hard to debate a hardcore believer in alt med without coming off as a pompous reactionary protecting his or her own turf.

Miracle Oil | UFO Abductology Implodes | Water Memory | Book Review: Emperor of All Maladies
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THE MAGAZINE FOR SCIENCE & REASON
A SKEPTICAL LOOK AT OVERNIGHT
AMNESIA
Power Lines and Cancer, Distant Healing and Health Care
The Numerology of 23
Slaying the Vampire: Solving the Chupacabra Mystery
GhoStly Book Endeavors
Published by The Committee for Skeptical Inquiry

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There was one omission and one typographical error in our article "Power Lines and Cancer, Distant Healing and Health Care":

1. The omission: In the section "Harmful Magnetic Fields" on page 41 at the end of second paragraph, a reference to Table 1 should appear after the phrase "greater than the energy associated with the external background electric field."
2. In the next paragraph after the phrase "fields used in MRI imaging," the reference should read "Table 2 compares . . ." (not Table 1).

Eugenie Mielczarek
Emeritus Professor of Physics
George Mason University

Unscientific Medical Products

Congratulations for taking on Wal-Mart for their marketing and promotion of the homeopathic flu remedy Boiron Oscillococcinum! I have forwarded a copy of the CFI/CSI statement (SI, May/June 2011) to two organizations concerned with Wal-Mart's labor practices, WalmartWatch and the National Labor Committee.

I have gone on the Boiron website and found that they sell quite a few homeopathic remedies. The stores they listed that sell their products in my local area include quite a few health food stores. Wal-Mart and Walgreen's pharmacies were not on the list. It is my impression that an attack on mainline retailers would have little impact on Boiron sales, which appear to be largely through an array of independent retailers who are undoubtedly believers in homeopathy. A more effective, although

difficult, approach would be to press for expanding the FDA's authority to include requiring proof of effectiveness of supplementary remedies. Perhaps CSI could set up an online letter or petition to Congress one could sign. This approach has been used by a number of activist groups.

This approach might be effective on another issue, which was raised by Mielczarek and Araujo in their article "Power Lines and Cancer, Distant Healing and Health Care." They note that NIH's National Center for Complementary and Alternative Medicine (NCCAM) provides support and respectability to unscientific, fringe medical practices. Perhaps now, when Congress is in a frenzy to reduce the spiraling cost of health care, would be a good time for CSI to start a petition or letter-writing campaign urging Congress to save $149 million by eliminating the budget for NCCAM.

David W. Briggs, PhD
Marion, Massachusetts

Numerology of 23

Mark Benecke's article ("The Numerology of 23," SI, May/June 2011) was interesting, but much of the mystery explored in the paper could have been eliminated by referring to mathematical properties first proven by Euclid. Two numbers are relatively prime if they have a largest common divisor of 1, and if A and B are relatively prime numbers then there are integers m and n such that $Am + Bn = 1$ (see proposition 1.2.2 at www.math.niu.edu /~beachy/aaol/integers.html).

In the case of this article, since 23 and 28 are relatively prime, $23m + 28n = 1$ for some m and n. For $m = 11$ and $n = -9$, we have $(11 \times 23) + (-9 \times 28) = 1$. For any desired number K, we have $23(Km) + 28(Kn) = K$. Thus it is not surprising that we can use 23 and 28 to generate any desired number. Once we have one way, we can look for other ways that are more "interesting."

Marvin Zelkowitz
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(President, National Capital Area Skeptics, www.ncas.org)

I just read Benecke's article on the numerology of 23. Perhaps Fleiss could have saved himself from his fool's errand had he known some simple number theory. The numbers 23 and 28 are relatively prime, meaning their greatest common divisor is the integer 1. One can readily prove from that fact that there exists an X and Y such that $28X + 28Y = 1$. In this case, $(14 \times 28) + (-17 \times 23) = 1$. Therefore, for any number n, we have that $n \times 1 = n([14 \times 28] + [-17 \times 23]) = (14n \times 28) + (-17n \times 23)$, and we can express any number as a sum of multiples of the two numbers. Furthermore, we can do this for any number and one of the infinitely many that are relatively prime to it. This sort of takes the magic out of it, and it makes you realize Fleiss was probably finding such relationships the hard way.

Adam J. Slagell
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A most entertaining essay by Mark Benecke contains a factual error. St. Vitus's dance is indeed a reference to chorea, but Sydenham's, not Huntington's. While the Huntington disease is an autosomal dominant hereditary condition, Sydenham's chorea is a part of rheumatic fever (together with carditis and glomerulonephritis) and therefore infectious, secondary to group *A Streptococcus*. In the pre-penicillin era of central Europe, there was a considerably higher incidence of Sydenham's then Huntington's. As neither of them has a gender prevalence, its statistical analysis in the article remains correct.

Ivan Stanko, MD
Rothschild, Wisconsin

There is an error in Mark Benecke's numerology article. Benecke states, "more women than men do not fall ill with St. Vitus dance (Huntington's disease)." St. Vitus's dance is an occasional sequel of a group *A* beta-hemolytic strep infection, the causative agent of rheumatic fever, and does occur more frequently in females. Huntington's disease is an autosomal dominant neurodegenerative disorder and is gender independent. The page number of the error can be found with the simple numerological calculation 28 + 23. Uncanny, isn't it?

Paul G. Story, MD
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Mark Benecke replies:

I am happy that the article did spark a discussion, and I am glad for all comments that came in. I will make sure to incorporate all comments and corrections in future speeches and articles.

Water 'Memory'

After reading Steven Novella's column on homeopathy, I got to thinking about a paradox that belief in homeopathy necessarily creates: If water could retain memory, as the proponents of homeopathy claim, then all of the Earth's water, having been around and in contact with so many compounds for billions of years, must have already picked up memories of those compounds and spread them all over the world. That means water must already retain memories from all of the compounds that cause disease. So when I turn on the faucet and fill up a glass, I'm receiving all of the cures for all of the diseases that have ever existed! But not so fast. Were this truly the case, then we would have already been inoculated by having consumed water in the past. Yet we still get those diseases! As I see it, this can mean only one of two things: either homeopathy doesn't work, or it doesn't work. Of course, one could still argue that homeopathy really does work, but then that person would actually be arguing that it doesn't work. Confused? Don't worry about it. Go have a beer. It's mostly made of water. You'll feel better.

Ray Sutera
Ocean Grove, New Jersey

Recently the subject of homeopathy came up in conversion with a couple friends independently of Novella's article. We're all on the same, strongly skeptical page on this topic. In the course of the conversation one of my friends, Jim Fleming, pointed out that if water has memory then you should never be able to purify it. Why would water only remember the "good" things that were getting diluted out? Shouldn't it also remember the bad things too? Instead of a homeopathy treatment making you better, couldn't it also make you sick?

Anyway it's an amusing thought given the silliness of the whole subject of homeopathy.

Rob Janes
Columbus, Indiana

Sidestepping Evolution a Shameful Disservice

The irritating influence of creationists is once again a factor in whether or not human evolution is taught in the public classroom. Kendrick Frazier's report on creationism's tenacious struggle to steer the debate in favor of believers ("Evolution May Win in Court But Not in the Classroom," SI, May/June 2011) impels me to point out two of the main gripes I have over the so-called controversy over teaching evolution.

1) The only controversy is the one manufactured by the religious as a way of airing their grievance over the fact that evolutionary science is controversial neither to the scientists who study it nor to those of us who properly understand it.
2) Those teachers whose job it

is to educate their students about how the world works, including the production of rich diversity, do their students a shameful disservice by sidestepping evolution because of creationism intimidation. The "cautious 60 percent" must shed their anxieties and heed their responsibility to their pupils.

Adam S. Thomas
Salem, Oregon

Memories Not Repressed

I was pleased to learn that Elizabeth Loftus has been honored by the American Association for Advancement of Science for her role in debunking the "repressed memory" scourge (SI, May/June 2011). As someone who grew up in a Jewish section of Brooklyn, I came into contact with a good number of Holocaust survivors who had endured horrors that were surely much worse than the sexual abuse allegedly experienced by the false memory crowd in the comfort of their suburban homes. I know of no concentration camp survivors who had "repressed" their memories of that dark time and required the intermediation of so-called therapists to recover said memories. Quite the contrary, they not only remembered what happened to them but were (and are) quite open in sharing their stories with others to ensure that this terrible chapter in history will not be forgotten or repeated. That is why there are Holocaust museums, films, and memorials.

It is clear that repressed memories make no sense from an evolutionary perspective, since suppressing memories of abuse, rather than recalling them, would increase the likelihood of future victimization.

Dennis Middlebrooks
Brooklyn, New York

TAMOz

While overall Kylie Sturgess's "The Wizards of TAMOz" (SI, May/June 2011) was a good article, I think a very important thing was missed: the organizers of this fantastic event. As a participant and panelist at TAMOz I can't say enough wonderful things about organizers Richard Saunders, Rachael Dunlop, Joanne Benhamu, Eran Segev, and Tim Mendham. The amount of time and effort put in by these individuals was tremendous, and I applaud their efforts.

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[THE LAST LAUGH BENJAMIN RADFORD

July/August 2011 Hidden Messages Puzzle Contest Winner: Eleanor Fraser, MD

'Living Each Day As If It Were His Last' Leaves Man Clinically Depressed

J. GOODBODY

Since vowing to experience life as though each day were his last, Thomas Rittman has unexpectedly fallen into a deep depression brought on by the stark realization that each day might very well be his last.

As part of his New Year's resolution, Rittman vowed to throw caution to the wind because, according to him, "Why put off until tomorrow what can be done today? I mean, you never know. I might not even be around—oh, crap."

Driven by his new feel-good philosophy on life, Rittman quit his job as sales manager at Pacific Islands Coffee Company, a Chicago-based beverage distributor. He also sold most of his belongings and began planning for a trip around the world.

Of course, it didn't take long for him to realize the real-life implications of this otherwise empty personal affirmation. Rittman was forced to consider his own mortality and come to the bleak understanding that life is actually quite fleeting and that tomorrow may actually never come.

"Why even bother?" Rittman asked, becoming so despondent that he would spend days at a time in bed. "I could die in my sleep tonight for all I know."

Things got worse for the thirty-six-year-old Rittman after he went on a five-day atonement spree to clear the air with the people in his life. He opened up to his friends and associates about his past wrongdoings in hopes of freeing himself of guilt before it was too late. Instead, he found that his confessions only made life more difficult.

Rittman damaged relationships with friends and family after confessing his past sins and misdeeds. He admitted to sabotaging a coworker's career by replacing the product pictures on the coworker's sales presentation with photographs of the coworker drunk at their last Christmas party. He told friends what he really thought of their wives and came clean about some of the disgusting things he did with the food in the break room refrigerator at the office.

"Well that didn't pan out like I thought it would," Rittman said of his attempt at making amends. "This was supposed to be liberating, but it only made things worse. I didn't expect to be around to have to deal with all the backlash."

To make matters worse, Rittman's girlfriend of five years has left him.

"At first I was really happy for Tom and his newfound love of life," said thirty-three-year-old Natalie Sawyer of Naperville. "We did all sorts of spontaneous and carefree things like skydiving and bungee jumping. We snuck into Wrigley Field and fooled around in center field. We even jumped on a float during the St. Patrick's Day Parade and sang 'Twist and Shout.' It was awesome."

But then, according to Sawyer, things got weird.

"Yesterday, he breaks down crying and tells me he wanted to be able to see his children grow up," Sawyer said, "... but he doesn't even have any kids."

"Next thing you know, Tom wants to do all this crazy stuff in bed, things he said he wanted to try before it was too late," Sawyer said. "Too late for what? I don't know what the hell he is talking about ... and what's up with the sailor suit and half-gallon bottle of ketchup? I had to get out of that relationship before that sicko hurt me or something. Oh, and by the way, it's hard to get in the mood when he's sobbing the entire time."

Emotionally crushed by the recent turn of events, Rittman continues to endure the hopelessness brought on by his carefree philosophy's morbid repercussions.

"*Carpe diem* my ass," Rittman said. "I alienated my friends, I lost Natalie, and I bailed on a great career. I'm going to have to live with those decisions for the rest of my life ... at least for the next day or so. I mean, you never know." ■

J. Goodbody frequently has thoughts in his head that make him smile. Were they expressed at the moment they poof into existence without some form of structured outlet such as satire, these same thoughts would cause significant distress among his friends, family, and coworkers. This is why he writes for *The Chicago Dope*, a satirical online newspaper, from which this article is reprinted with permission.

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